Amateur Radio

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COMMUNICATIONS & TECHNOLOGY

AUGUST 2001

CQ

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On the cover:
ICOM Founder and President Tokuzo Inoue, JA3FA. See exclusive *CQ* interview, p.22

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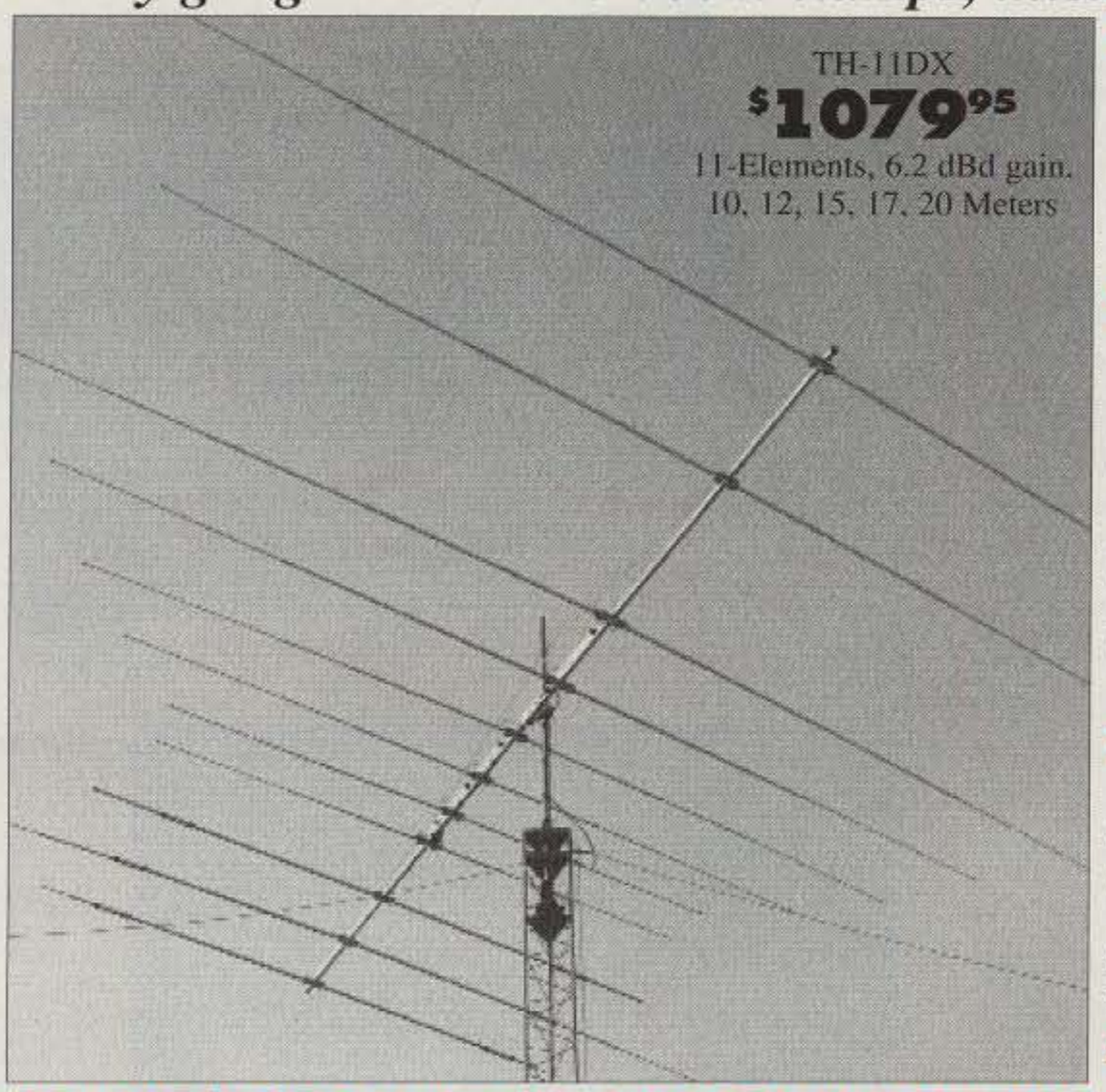

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The choice of top DXers.

With 11-elements, 6.2 dBd gain and 5-bands, the super rugged TH-11DX is *the "Big Daddy" of all HF beams!*

Handles 2000 Watts continuous, 4000 Watts PEP.

Every part is selected for durability and ruggedness for years of trouble-free service.

Features a low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

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7-Elements gives you an incredible avg *6.57 dBd gain -- the highest* of any Hy-Gain tri-bander!

Dual driven for broadband operation without compromising gain. SWR less than 2:1 on *all* bands.

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Includes *Hy-Gain's* diecast aluminum, rugged boom-to-mast clamp, heavy gauge element-to-boom brackets, BN-86 balun. For high power, upgrade to BN-4000.

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The broadband *five element* TH5-MK2 gives you an outstanding 6.1 dBd average gain.

Separate air dielectric *Hy-Q* traps let you adjust for maximum F/B ratio on each band.

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The super popular TH-3MK4 gives you the *most gain for your money* in a full-power, full-size durable Hy-Gain tri-bander!

You get an impressive 5.9 dBd average gain and a whopping 25 dB average front-to-back ratio. Handles a full 1500 Watts PEP. 95 MPH wind survival.

Fits on average size lot with room to spare -- turning radius is just 15.3 feet. Four piece boom is ideal for DXpeditions. Rotates with CD-45II or HAM-IV rotator.

Features *Hy-Gain BetaMatch*™ for DC ground, full power *Hy-Q*™ traps, rugged boom-to-mast bracket and mounts on standard 2"O.D. mast. Stainless steel hardware. BN-86 balun recommended.

TH-2MK3, $339.95. 2-element, 3.4 dBd Gain, 10,15,20 Meters

The 2-element TH-2MK3 is Hy-Gain's *most economical* full power (1.5kW PEP) full size tri-bander.

For just $339.95 you can *double* your effective radiated power and hear *15-20 dB* (=F/B) better!

Ruggedly constructed, top-performing, compact 6 foot boom, tight 14.3 foot turning radius. Installs almost anywhere. Rotate with CD-45II or HAM-IV. BN-86 balun recommened.

EXP-14, $549.95. 4-element, 5.9 dBd Gain, 10,15,20 Meters

Revolutionary 4-element compact tri-bander *lets you add 40 or 30 Meters!* Has 14 foot boom and tight 17.25 feet turning radius. Fits on roof tri-pod, mast or medium duty tower.

Hy-Gain's *patented* broadbanding *Para Sleeve* gives you less than 2:1 VSWR. 1.5kW PEP.

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QK-710, $169.95. 30/40 Meter option kit for EXP-14.

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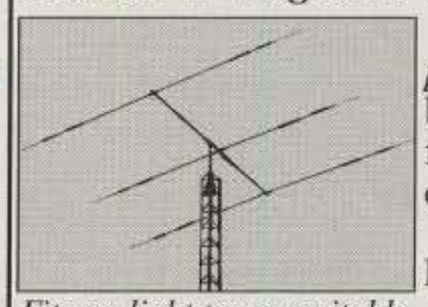


Fits on light tower, suitable guyed TV pole, roof tri-pod

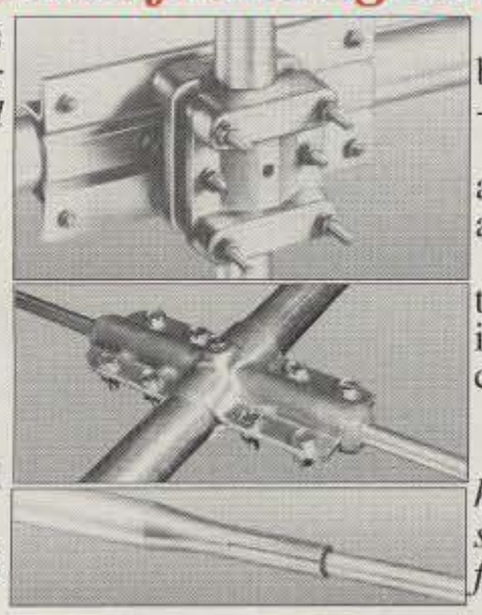
TH-3JRS, $329.95. Hy-Gain's *most popular* 3-element 10, 15, 20 Meter tri-bander fits on most lots! Same top performance as the full power TH3MK4 in a compact 600 watt PEP design.

Excellent 5.8 dBd gain and 25 dB F/B let *you* compete with the "big guns".

Tooled manufacturing gives you *Hy-Gain* durability with 80 MPH wind survival.

Model No.	No. of elements	avg Gain dBd	avg F/B dB	MaxPwr watts PEP	Bands Covered	Wind sq.ft. area	Wind (mph) Survival	Boom (feet)	Longest Elem. (ft)	Turning radius(ft)	Weight (lbs.)	Mast dia O.D.(in.)	Recom. Rotator	Retail Price
TH-11DX	11	6.2	22	4000	10,12,15,17,20	12.5	100	24	37	22	88	1.9-2.5	T2X	$1079.95
TH-7DX	**7**	**6.57**	**21**	**1500**	**10, 15, 20**	**9.4**	**100**	**24**	**31**	**20**	**75**	**1.5-2.5**	**HAM-IV**	**$819.95**
TH-5MK2	5	6.1	20	1500	10, 15, 20	7.4	100	19	31.5	18.42	57	1.5-2.5	HAM-IV	$699.95
TH-3MK4	**3**	**5.8**	**25**	**1500**	**10, 15, 20**	**4.6**	**95**	**14**	**27.42**	**15.33**	**35**	**1.9-2.5**	**CD-45II**	**$439.95**
TH-3JRS	3	5.8	25	600	10, 15, 20	3.35	80	12	27.25	14.75	21	1.25-2.0	CD-45II	$329.95
TH-2MK3	**2**	**3.4**	**15-20**	**1500**	**10, 15, 20**	**3.25**	**80**	**6**	**27.3**	**14.25**	**20**	**1.9-2.5**	**CD-45II**	**$339.95**
EXP-14	4	5.9	25	1500	10,15,20 opt. 30/40	7.5	100	14	31.5	17.25	45	1.9-2.5	HAM IV	$549.95

Tooled Manufacturing . . . Highest Quality Materials



1. Hy-Gain's famous super strong *tooled* die cast *Boom-to-Mast Clamp*

2. *Tooled* *Boom-to-Element Clamp*

3. Thick-wall *swaged* aluminum tubing

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CQ Amateur Radio

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On The Cover: Tokuzo Inoue, JA3FA, Founder and President of ICOM. Read our exclusive interview on p. 22. (Cover photo courtesy ICOM, Inc.)

144 220 +440

Everything adds up: Kenwood's new FM Tribander (144/220/440MHz) offers dual-channel RX capability and prime performance in a superbly compact design.

- Receives 2 frequencies simultaneously even on the same band
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- Bar antenna for receiving AM broadcasts
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- 435 memory channels, multiple scan functions
- 7.4V 1550mAh lithium-ion battery (std.) for high output[2] and extended operation
- 16-key pad plus multi-scroll key for easy operation
- Built-in charging circuitry for battery recharge while the unit operates from a DC supply
- Tough construction: meets MIL-STD 810 C/D/E standards for resistance to vibration, shock, humidity and light rain
- Large frequency display for single-band use
- Automatic simplex checker
- Wireless remote control function
- Battery indicator • Internal VOX • MCP software

[1] Note that certain frequencies are unavailable. [2] 5W output

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Ham Radio News

From The CQ Newsroom

Fire and Rain: Hams Respond

Whether it was wildfires in New Mexico or a tropical storm on the Gulf coast, hams answered the call to provide emergency communications in late spring. Two separate wildfires in Lincoln County, New Mexico kept hams there busy in early June, and a precautionary shutdown of power knocked out two repeaters, forcing amateurs to use VHF simplex and a solar-powered repeater. The *ARRL Letter* quoted RACES officer Rick Sohl, K5RIC, as saying the extended power outage provided excellent training for hams in establishing and maintaining communications without mountaintop repeaters.

Meanwhile, Tropical Storm Allison, the first named storm of the 2001 hurricane season, dumped record amounts of rain on some parts of Texas, Louisiana, and Mississippi, and caused the worst flooding there in decades. On Saturday, June 9 Houston-area hams attending the Dallas HamCom hamfest were informed of an emergency callup and were asked to check in with emergency management officials on their way home. The FCC declared a communications emergency for several days and the *ARRL Letter* was reporting that calls for ham volunteers were continuing a full week after the rains began. Ham radio reportedly provided critical links between emergency operating centers when phone lines went down, and assisted with relaying fire emergency calls when Houston's 911 dispatch system failed.

Across the Gulf of Mexico in Florida, ham radio volunteers at the National Hurricane Center were honored as "Volunteers of the Year" at the South Florida Hurricane Conference, according to the *ARRL Letter*. Hams have operated W4EHW from the center for 22 years, collecting weather and damage reports and passing them on to forecasters.

New Code Test Policy In Force

It's harder to "guess for success" on amateur radio code tests. As of July 1, 2001 multiple-choice exam quizzes were eliminated, replaced by fill-in-the-blank question sheets and, as always, copying at least one minute of error-free code. The new standards were adopted by the National Conference of Volunteer Examiner Coordinators (NCVEC), a group representing the nation's VECs that determines the actual question pool and makes up the tests that are distributed to Volunteer Examiners around the country. In addition, the Conference decided that all code exams should use tones with a frequency between 700 and 1000 Hz, and that messages will use the Farnsworth method, in which individual characters are sent at a higher speed—13–15 words per minute for all amateur exams as of July 1—with spacing between letters added to slow the overall speed to 5 wpm. According to ARRL/VEC Manager Bart Jahnke, W9JJ, this represents a slower character speed than the 18 wpm standard previously used by ARRL/VEC examiners.

Canada Joins 5 WPM Code Parade

Canada has joined the growing list of nations with a top Morse code exam speed of 5 words per minute for full HF amateur privileges. According to the Radio Amateurs of Canada, new rules took effect May 19, granting full HF privileges to holders of Basic amateur licenses with 5 wpm Morse credit.

ARRL Seeks Probe of Long-Range Cordless Phones

The ARRL is asking the FCC to look into internet sales of so-called "long-range cordless telephones" to customers in the U.S. As *CQ* first reported on its website news page last November, these phones operate on VHF and UHF frequencies including the 2 meter ham band. They appear to be made in China and have been showing up for sale on U.S. websites since last March.

In a recent letter to FCC Enforcement Bureau Chief David Solomon and other Commission officials, the ARRL asked the FCC to investigate and "take appropriate action" against companies marketing these phones in the U.S. According to the *ARRL Letter*, the League also wants the FCC to look into additional products that operate on amateur frequencies, such as 434 MHz video surveillance equipment. The *Letter* says the ARRL is looking for reports of actual harmful interference caused by these phones and other devices, and asks that such reports be e-mailed to <rfi@arrl.org>.

Education Project Pilot School Gets Station

The Everett Lee DeGolyer Elementary School in Dallas, Texas is the proud owner of a brand-new ham station, courtesy of the ARRL Education Project Fund and over a dozen new hams, including the teacher in charge of the ham club there. The school is serving as a pilot location for the ARRL's "Big Project" education initiative. According to the *ARRL Letter*, the Education Project Fund recently purchased some $2600 worth of equipment for the school station, K5DES, including an HF/VHF/UHF multimode transceiver, antennas, and accessories. According to ARRL President Jim Haynie, W5JBP, similar funding will be available for other school programs once the League hires a project coordinator and the program gets fully underway.

Nevada Writes PRB-1 Into State Law

Nevada has become the 13th state to incorporate provisions of the FCC's "PRB-1" antenna decision into state law. Governor Kenny Guinn signed the legislation in May, according to the *ARRL Letter*, requiring municipalities to "reasonably accommodate amateur service communications" and mandating that ordinances restricting amateur towers or antennas "constitute the minimum level of regulation practicable to carry out the legitimate purpose of the governing body." A provision applying the requirements to future deed restrictions and homeowner association covenants was removed from the bill in committee. The new law takes effect October 1. Similar legislation is pending in New York and Wisconsin.

QRZ.com For Sale

QRZ.com owner and webmaster Fred Lloyd, AA7BQ, says he wants to retire from the web business and spend more time teaching people how to fly airplanes. Thus, says the *ARRL Letter*, he's put the QRZ.com website up for sale. The site offers an online callsign server and a variety of other services. For details, contact Lloyd at <flloyd@qrz.com> or go to <http://www.qrz.com/qrz_sale.html>.

Mr. Smith Goes to Tennessee

Doug Smith, KF6DX, has joined the engineering staff of Ten-Tec, Inc., and will be moving to the Sevierville, Tennessee area to take up his new duties. Smith had been the lead design engineer for the Kachina 505DSP computer-controlled amateur transceiver. Kachina recently announced that it is leaving the amateur and HF markets, leaving Smith with little to design. Smith is also Editor of the ARRL's *QEX* technical journal and is chairman of the ARRL's Digital Voice Committee. He joined the Ten-Tec staff on July 1.

Additional and updated news is available on the Ham Radio News page of the CQ website at <http://www.cq-amateur-radio.com>. For breaking news stories, plus info on additional items of interest, sign up for CQ's free online newsletter service. Just click on "CQ Newsletter" on the home page of our website.

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DESKTOP SWITCHING POWER SUPPLIES

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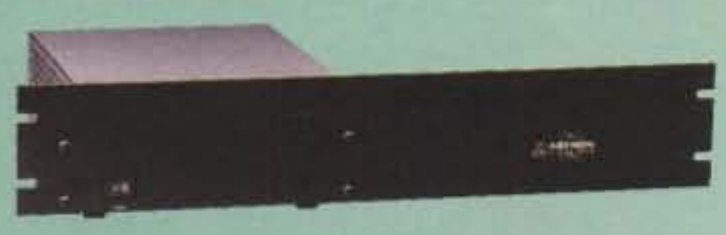
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅜ x 6 x 9	3.4
SS-18	15	18	1⅜ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¾ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¾ x 7 x 9⅝	5.0



MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0

MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

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EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

CIRCLE 134 ON READER SERVICE CARD

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SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

Zero Bias

BY RICH MOSESON, W2VU

An Editorial

Lies, Myths, and Marketing

"It has never been easier to become a ham radio operator." "It's easier than ever to become a ham radio operator."

These quotes from the back covers of two current licensing guides summarize the message that we, collectively, have been trying to get out to potential hams for the past 15 years or so. We do it formally, as above, and informally in grousing on the air about "dumbing down" licensing requirements, "giving away" privileges and "turning ham radio into CB." In other words, it's *so* easy to become a ham today that nearly *anyone* can, and nearly *everyone* should.

Lies

There are two big problems with this "easy, easy, easy" message: 1) It hasn't been particularly effective, and 2) it's a lie. And perhaps it doesn't work very well *because* it's a lie. A well-intentioned lie, perhaps, but a lie nonetheless. (I will admit up front that I have been guilty in the past of promoting the "easy" lie. But in the past few years, I've been coming to the realization that I was wrong, and it is wrong.)

First of all, we really *don't* want *everyone* to become a ham because we wouldn't be special anymore and the bands would be crowded beyond belief. Secondly, becoming a ham is *not* easy, no matter what it says on the back of the books. While you may get more operating privileges today for passing a test that's less rigorous than it was 20 years ago (and I'm not convinced it is), getting a ham license or upgrading your license is *not* easy. It's hard. You have to work, you have to study, you have to learn, you have to practice, you have to make a commitment to investing time and energy into the process. Maybe you don't have to draw a schematic or pass a 20-word-per-minute code test anymore, but you *do* have to know about maximum permissible exposure levels for RF energy, gray-line and HF scatter propagation, spin modulation and Faraday rotation on satellite signals, and the half-power bandwidth of a parallel resonant circuit with a resonant frequency of 14.25 MHz and a Q of 187. Easy? Maybe if you're an engineer. But not for the rest of us. Getting a license may indeed be "easier than ever," but it still isn't easy.

Perhaps one reason the "easy" theme hasn't worked as a recruiting message is that people are drawn in by how "easy" it is, then discover that there's hard work involved and feel deceived, so they drop out. Maybe it's time to stop lying about how "easy" it is to become a ham and start promoting it as the challenge that it is to those people who like challenges and are willing to do the work that comes with them.

Myths

Here's another common message about ham radio being spread around to the general public today: _____ . That's right. Nothing. "Ham radio? Do people still do that?" "Didn't the internet kill off ham radio?" "Why don't you just use a cell phone?" Many people have no idea what ham radio is all about today, or even that it still exists, mostly because the computer, internet and cell phone companies have huge advertising and marketing budgets to keep their messages in front of the public. We don't. Plus, many of us feed into these perceptions of ham radio's imminent demise by either spreading them ourselves or failing to refute them. How often do you tell people that hams have their own fleet of communication satellites? That we built ourselves? That we were using digital wireless communication long before there was an internet? That we can talk to astronauts in orbit? That computers haven't replaced ham radio, they've made ham radio bigger and better than ever?

Ham radio *does* have a problem, but it's not a problem of falling license numbers (they're not). It's not a problem of falling license renewal rates (they're not). And it's not a problem of decreasing activity (it's not; just look at the 20 pages of CQ WW contest results in this issue). It's a problem of perception. Ham radio today is perceived by many non-hams as arcane, obsolete and irrelevant. That's a myth, of course. We know that (I hope), but they don't.

We know that people still "do" ham radio. *We* know that ham radio is *different* from cell phones or the internet and it's not valid to assume that increasing popularity of one necessarily translates into decreasing popularity for the other. *We* know ham radio continues to be unique, relevant, and important. But we have trouble explaining that to the general public.

Here's my feeble effort: First and foremost, ham radio offers two important things that cell phones and the internet do not: 1) The ability not only to use radios for communicating, but the opportunity to learn how radio works, translating into job opportunities; and 2) an intangible sense of "magic" that allows us to communicate over great distances, or even into space, without wires and without an extensive wired network in the background.

The world of commercial wireless communication is expanding at an exponential rate. And each new wave of expansion and consumer acceptance deepens the already critical shortage of engineers and technicians who "do" RF. Cell phone users or wireless computer LAN (local area network) users generally don't have the opportunity to help design, build or maintain the networks that support their communications. Hams do. Granted, most people couldn't care less how these systems work, as long as they do work. But there are always a few who *do* want to know, and those are the people we want. Because today's ham radio is the only place outside of on-the-job training to get hands-on experience with the RF systems our society is coming to depend on.

Let's look at the internet. There's no point trying to compete with the internet for e-mail or the massive amount of information accessible on the World Wide Web. But when the National Weather Service wants to collect real-time weather information from Skywarn volunteers, it turns to ham radio, not the internet. Between voice nets and weather-related APRS software that regularly beacons updated weather conditions on a map showing each station's location, instant and accurate reports are readily available. And when the infrastructure that carries the internet is damaged by a storm, hams somehow manage to stay on the air.

Cell phones are also wonderful tools. They're more efficient than repeater autopatches for calling in emergencies. The person you're calling doesn't have to be licensed or have their radio tuned to your frequency. But mobile cell phone use is being restricted or banned in more and more places, and cell phones don't always work. If you're outside the relatively small range of a cell site receiver, or if the site through which you're trying to call is overloaded, your phone is useless. Nearly every month, our Public Service column details some instance where the cellular system broke down and hams stepped in to provide needed communications.

How is it that ham radio can so often get through when cell phones can't? The main reason is that ham radio has something that virtually no other radio service does: a range of flexibility that permits you to try different modes and different frequencies until you find a combination that works. Outside of the military, no other radio ser-

vice allows users to switch between voice, digital, image or code transmissions on the same frequency, or to choose a frequency from two dozen bands ranging from 1800 kHz to 250 GHz. Ham radio is all about flexibility and adaptability.

Now, let's look at the "magic." We don't have a monopoly on this. Horses and sailboats are no longer the most efficient means of transportation. Haven't been for a very long time. Yet there is a sense of magic in being moved great distances by only the wind, and in the speed and power that a horse shares with its rider, that have kept both sailing and horseback riding very popular, despite being "obsolete." Ham radio shares that magic, that freedom to go where you want when you want, depending more on nature than on "more efficient machines," without tolls, inflated fuel prices, monthly access fees or hourly connect charges. Ham radio is "back to nature" communication.

I also like to compare ham radio to fishing. Fishing is hardly the most efficient way to put fish on your table for dinner. It's much easier to go to the supermarket. But most people who go fishing today are looking for more than a meal. They're looking for a challenge, and they want to soak in the experience. Will they get a bite? Will they catch anything? Big or small? Common or unusual? Often, they're also looking for the camaraderie of, and friendly competition with, their fellow fishermen. Who else would appreciate their "fish stories"? Fishing as a hobby has not suffered from the presence of commercial fishermen or the availability of fresh fish in the supermarket.

We hams go fishing every time we call CQ or tune around looking for DX. Will we get a bite? Will we have to struggle to "land" the QSO? Will the "fish" be around the corner or rare DX? We do it for the challenge, and for the satisfaction of meeting the challenge when we succeed. Ham radio is many things, but it's not ... easy.

Marketing

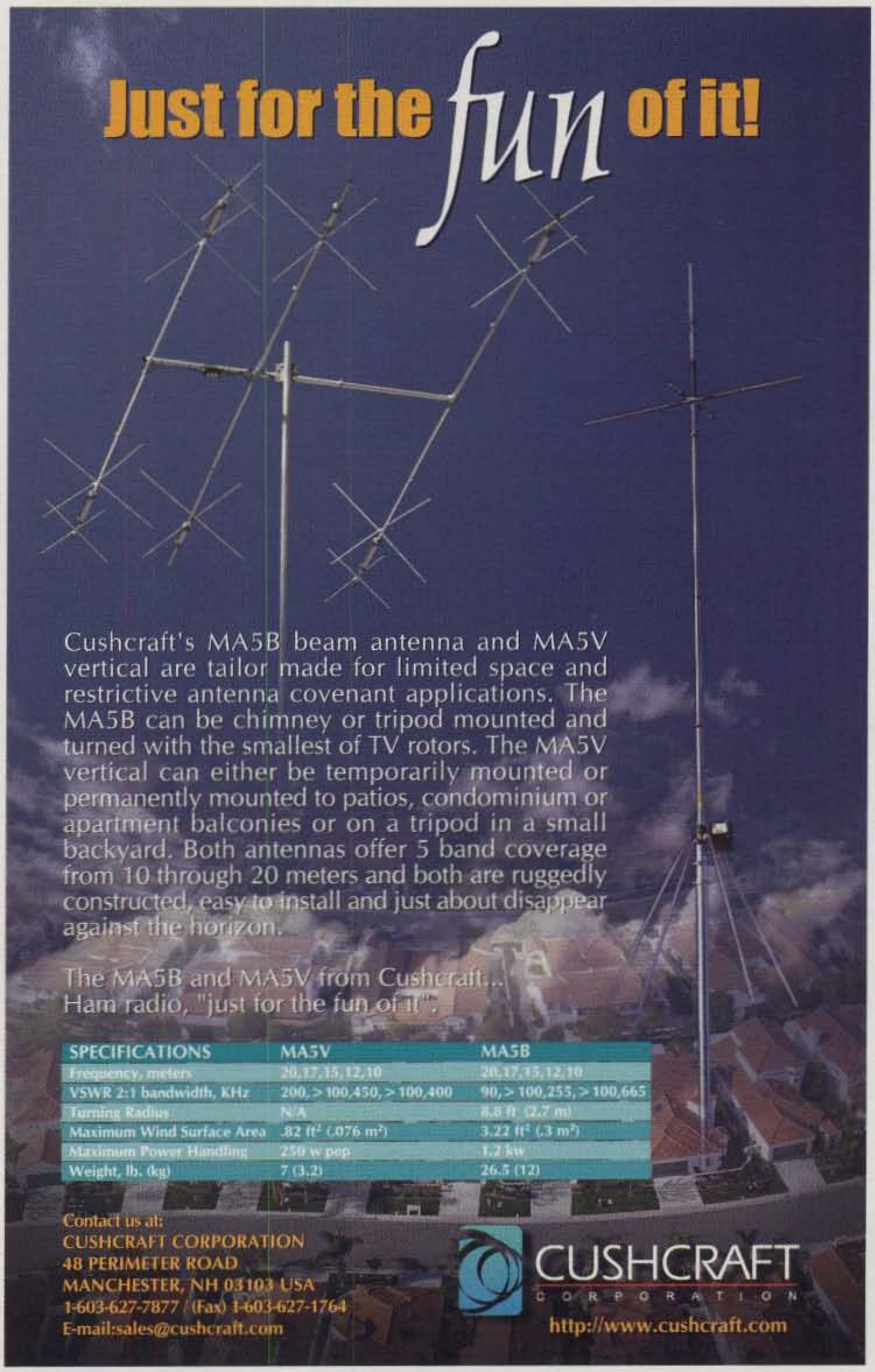
OK, we've identified two inter-related problems that are holding down recruitment—misrepresentations about the vitality of ham radio and its uniqueness vis-à-vis the internet (the myths), and a long-standing policy of trying to promote ham radio as being *sooo* easy (the lies), even though it's not working. So what can we do?

The answer is in part 3 of this month's title: Marketing. We must do a better job of marketing our hobby and of keeping it in the public eye in a positive light. I know we have more than a few people in ham radio who are marketing professionals (I've met some of you). I'm willing to bet there are some pretty darn good marketing professionals among that group. And I've got a sneaking suspicion that some of those darn good marketing professionals who are hams have already come up with ideas for doing a better job of marketing amateur radio, and are only waiting for someone to ask for their help. Well, we're asking.

The *CQ* Marketing Challenge

We'd like to challenge the marketing professionals among us to contribute their professional expertise to help all of us do a better job of marketing ham radio. We invite your ideas for more effectively marketing who we are and what we do (perhaps building on a comment I heard on the air this morning that "without a radio, I'd be lost"), ideas that will help dispel the myths that ham radio is dead, ideas that will realistically promote ham radio as an activity for people seeking a challenge (maybe a variation on the old Marine Corps recruiting theme: "We're looking for a few good hams ... do YOU have what it takes?"). We'd like to hear ballpark figures on the costs of running a good marketing campaign and perhaps, some ideas of where we might find the funding to pay those costs (remember, we're selling ham radio itself, not a specific product, so there will be no direct "profit" to pay for the campaign). Please send us your ideas via e-mail to <w2vu@cq-amateur-radio.com> or by postal mail to *CQ* Marketing Challenge, c/o *CQ* magazine, 25 Newbridge Road, Suite 405, Hicksville, NY 11801. You could have an opportunity to influence the future of amateur radio.

73, Rich, W2VU



Announcements

• **National Lighthouse/Lightship Weekend** – In celebration of National Lighthouse Week the Amateur Radio Lighthouse Society will sponsor National Lighthouse/Lightship Weekend August 4–5. Members and nonmembers are encouraged to operate either from or make contact with amateur radio stations operating at lighthouses and/or lightships. Lighthouse participants operate portable, mobile, marine mobile, or maritime mobile from any existing or nonoperational lighthouse or lightship anywhere is the world. For details see the ARLHS website <www.ARLHS.com>.

• **The following Special Event stations will be on during August:**

K1LX, from Pemaquid Point Lighthouse, Bristol, Maine; Lincoln County ARC; 1200Z Aug. 4 to 2200Z Aug. 5 on 3.965, 7.265, 14.265, 21.365 MHz. Send QSL and SASE to LCARC, P.O. Box 171, Bristol, ME 04539.

N1B, from commemoration of 1777 Battle of Bennington; Southern Vermont ARC; 1300–2000Z Aug. 17 and 18 on 14.285 MHz. Certificate: Howard Crego, N1RRW, 415 Ridge Road, Shaftsbury, VT 05262.

K2L, from Buffalo, New York Lighthouse; Western New York DX Assn.; Aug. 18–19 on all bands CW/SSB. For special photo QSL, QSL direct to WB2YQH, P.O. Box 73, Spring Brook, NY 14140 with SAE/SASE. All DX QSOs will be QSLed automatically via the bureau.

W2GSB, from Fire Island Lighthouse, New York (ref #670, IOTA NA-026, USIA NY-013-S); Great South Bay ARC signing W2GSB/Lighthouse); Aug. 18–19 *(no times or freqs. given—ed.)*. QSL to W2GSB, P.O. Box 1356, West Babylon, NY 11704 (SASE); DX okay via bureau to W2GSB. <www.gsbarc.org/FI2001.htm>.

W2T, from Tucker's Island Lighthouse, Tuckerton, New Jersey; Old Barney ARC; 1300Z Aug. 18 to 2300Z Aug. 19 on 7280, 14280, 21380, 28480 kHz, 146.835/repeater. For certificate and QSL (9×12 SASE, 55 cents postage) or QSL only (SASE or SAE/IRC) QSL via N2OO, P.O. Box 345, Tuckerton, NJ 08087.

W3SSA, from 66th anniversary of Social Security Act, Baltimore, Maryland; Social Security Employee's ARC; 1300–2100Z Aug. 18 on 7.290, 14.290, 21.290, 28.390 MHz. For certificate send SASE to Greg Stec, K3ANG, 1624 Pickett Rd., Luthierville, MD 21039.

W4MUS, from 180th Jousting Tournament, Mount Solon, Virginia; Valley ARA; 1000Z Aug. 18 to 0400Z Aug. 19 On 3.870, 7.230, 14.310, 28.410 MHz. For certificate send SASE to VARA, c/o Richard Huttinger, KF4QZG, 1345 Chatham Rd., Waynesboro, VA 22980-3301.

N8SL, from Sturgeon Point Lighthouse, Michigan; 0001Z Aug. 18 to 2359Z Aug. 19 on 7.270, 14.270, 21.370, 28.370 MHz ±QRM. For certificate send SASE to WB8IIA, 30960 Bramley Circle, New Hudson, MI 48165.

K8ONV, from Boca Grande Lighthouse (NA-069), Florida; Englewood ARC; 1400–2000Z Aug. 19 on 14.275, 21.375, 28.375 MHz. Special Event QSL from EARS, P.O. Box 572, Englewood, FL 34295-0572. <vkamp1@glnet.com>

W8ID, from Buckeye District Cub Scout Day Camp, Bascom, Ohio; Seneca RC; 1300–1900Z each day Aug. 6–10 on 14.225, 21.225, 28.325 MHz. Send QSL and SASE to Curtis Robison, KC8PUY, 88 W. Market St., Tiffin, OH 44883.

W8PIF, from Menominee Lighthouse/Waterfront Festival, Michigan; Marinette/Menominee ARC; 1600–2100Z Aug. 4 on 7.250, 14.250, 21.350, 28.450 ±20 kHz QRM. For certificate send QSL and SASE to M&M ARC, P.O. Box 1082, Marinette, WI 54143.

W8UMD/90, from Treaty City ARA 90th anniversary, Greenville, Ohio; 1300–2300Z Aug. 4 and 5 in General phone and CW bands. For QSL or certificate send large SASE to TCARA W8UMD/90, P.O. Box 803, Greenville, OH 45331-0091.

NØG, from Rail Fest 2001, Silverton, Colorado; Durango ARC; Aug. 23–26 on 14.050, 14.250, 21.350, PSK31. For QSL send to Durango ARC, P.O. Box 2942, Durango, CO 81302.

WØMTL, from Mark Twain Lighthouse, Hannibal, Missouri; Hannibal ARC; 2200Z Aug. 3 to 2400Z Aug. 5 on phone 3.970, 7.270, 14.270, 21.370, 28.370; CW 3.530, 7.030, 14.030, 21.030, 28.030. For QSL and certificate send QSL and 9×12 SASE (55 cents postage) WØMTL, Hannibal, MO ARC, P.O. Box 1522, Hannibal, MO 63401-1522,

• **The following hamfests, etc., are in August:**

Aug. 4, **Finger Lakes HAM-IN**, Tompkins County Airport, Route 13 NE of Ithaca, New York. Contact Richard Spingam, 607-387-5251; e-mail: <richard@eagleprint.com>. (Talk-in 146.970–; exams)

Aug. 5, **Greater Buffalo Summer Hamfest/ARRL WNY Section Convention**, Main-Transit Fire Dept. Recreation Grounds, Lancaster, New York area. Call 716-634-4667, e-mail: <luke@towncountryflorist.com>; <http://larc.hamgate.net>. (Talk-in 147.255+ [107.2 Hz])

Aug. 5, **Shenandoah Valley ARC Hamfest**, Clarke County (Ruritan) Fairgrounds, Berryville, Virginia. Contact Brian Mawhinney, WB3FUM, 540-665-0761; e-mail: <wb3fum@arrl.net>; <http://www.Vvalley.com/svarc>. (Talk-in 146.82, exams 1 PM)

Aug. 5, **Land of Lakes Angola Hamfest**, 4-H Park, Crooked Lake, Angola, Indiana. Contact Bill Brown, WD9DSN, 219-475-5897; e-mail: <sharon.l.brown@gte.net>. (Talk-in 147.180 [131.8 pl])

Aug. 11, **Lower Columbia ARA Ham Radio, Computer, Electronics Swapmeet**, Cowlitz Co. Expo Center Fairgrounds, Longview, Washington. Contact Bob Morehouse, KB7ADO, 360-425-6076 evenings; e-mail: <kb7ado@aol.com>; <www.qsl. net/nc7p>. (Talk-in 147.26+, pl 114.8)

Aug. 11, **Tri-State ARA Hamfest & Computer Show**, Veterans Memorial Field House, Huntington, West Virginia. Contact Garry Ritchie, W8OI, 304-733-1300. (Exams 10 AM, info W8OI)

Aug. 12, **St. Cloud ARC Hamfest**, Del-Win Ballroom, St. Joseph, Minnesota. See <www.w0sv.org>. (Talk-in 147.015; exams 1 PM)

Aug. 11, **Hamfesters Hamfest**, Will County Fairgrounds, Peotone, Illinois. Contact Robert Nelson, WB9WFR, <wb9wfr@arrl.net>. (Talk-in 146.52, 146.64 [–107.2])

Aug. 12, **Shrewsbury, PA Ham & Computer Swapfest**, Fire Hall, Shrewsbury, PA. Contact Bill, 717-235-2570; e-mail: <w3pn@yahoo.com>; <www.carli-online.com/hamfest>. (Talk-in 146.70)

Aug. 12, **Greentown Hamfest**, Lions Club Fairgrounds, Greentown, Indiana. Contact L. B. Nickerson, K9NQW, 765-668-4814; e-mail: <k9nqw@skyenet.net; <www.grantarc.com/greentown.html>. (Talk-in 146.91, 146.79; exams)

Aug. 18, **Ramapo Mountain ARC Hamfest**, American Legion Hall, Oakland, New Jersey. Contact Steve Oliphant, N2KBD, 973-962-4584; e-mail: <rmarc@qsl.net>; <www.qsl.net/rmarc>.

Aug. 18–19, **Huntsville Hamfest**, Von Braun Center, Huntsville, Alabama. Call 256-880-8004; <www.hamfest.org>. (Talk-in 146.94; exams both days 10 AM) ***See us at the CQ Booth!***

Aug. 19, **Gloucester County ARC Ham, Electronic, Computer Fleamarket**, 4-H Fairgrounds, Mullica Hill, New Jersey. Call 856-478-4738. (Talk-in 147.780/.180; exams 9:30 AM)

Aug. 19, **2001 ARRL Kansas State Convention**, Salina Bi-Centennial Center, Salina, Kansas. Contact Ron Tremblay, WAØPSF, 785-827-8149; e-mail: <rtremblay@kscable.com>. (Talk-in 147.030+, 443.900+; exams 9 AM)

Aug. 19, **WARA Hamfest**, Trumbull campus, Kent State Univ., Warren, Ohio. Contact Renee McCaman, KB8SVF, 330-847-8478; e-mail: <mccaman@cboss.com>. (Exams 9:30 AM)

Aug. 19, **TARA Hamfest**, Tippecanoe County Fairgrounds, Lafayette, Indiana. Contact David Dull, WB9BRX, 765-743-8305; e-mail: <dave@dullville.com>; <www.w9reg.org>.

Aug. 25, **LaPorte ARC Summer Hamfest**, LaPorte County Fairgrounds, LaPorte, Indiana. Contact Neil Straub, WZ9N, 219-324-7525; e-mail: <nstraub@niia.net>; <www.geocities.com/k9jsi>. (Talk-in 146.52, 146.61– PL 131.8)

Aug. 25, **Columbia, MO Hamfest & ARRL State Convention**, National Guard Armory, Columbia, Missouri. E-mail: <dale@tranquility.net>; <www.qsl.net/cmra>. (Talk-in 146.76; exams 10 AM)

Aug. 25–26, **Duke City Hamfest**, Rio Rancho National Guard Armory, Albuquerque, New Mexico. Contact Marcus Lieberman, KM5EH, 505-836-1724; e-mail: <km5eh@arrl.net>; <www.qsl.net/dchf>. (Talk-in 145.33–, 444.00+; exams)

Aug. 31, Sept. 1–2, **2001 Eastern VHF/UHF Conference**, Radisson Hotel, Enfield, Connecticut. See <http://uhaweb.hartford.edu/newsvhf/vhfconf.html>.

To place a item in "Announcements", send the specifics about your special event or hamfest to CQ Announcements, 25 Newbridge Road, Hicksville, NY 11801; fax 516-681-2926; or e-mail: <hamfests @cq-amateur-radio.com>. Deadline is the first of the month that is two months prior to the event date (i.e., May 1st for a July event).

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Our Readers Say

Skeptics Abound...

The following letter was directed to Prof. Emil Heisseluft regarding his April article, "New HASSEL Stations Ready to Cleanse the Ham Bands."

Herr Dr. Heisseluft,

The brilliance of your research is equaled only by the clarity of your writing. I understand that your many obligations limit you to only one *CQ* contribution per year—in the April issue of course! I very much hope that next year you will write about your methods of establishing ham-to-flying-saucer communications...

Paul Saff (via e-mail)

Paul: Prof. Heisseluft was too busy to reply in person, but he did point out the fact that amateurs are involved in much of the work currently being done in SETI, the Search for Extra Terrestrial Intelligence, and that if there is anyone out there trying to communicate with us, there's a good chance it will be a ham who gets the message—and wants a QSL!

Long-Time *CQ* Reader

Editor, *CQ:*

I always look forward each month to reading *CQ*. They even put my picture in the July 1953 issue in the "Novice Shack" column, but I never did write back to tell them that they spelled Aurora wrong! Also, a friend of mine, W4TEW, and I built a couple of 10 meter "Handy-Talkies" from the same issue on page 46. We were in Tech school together.

73, Dave, W4YDY (via e-mail)

Defend SWLing

Editor, *CQ:*

It's time to take the gloves off. It's time for publications such as yours to come out swinging on behalf of North American SW radio enthusiasts who are being systematically disenfranchised by some of the world's most prestigious international broadcasters. For years North America has provided a loyal listening audience for these broadcasters, and now the broadcasters think that they can, in one fell swoop, disown their listeners by the simple expedient of telling us all where we can find their "real audio" feed on the internet. Yes, it was a quaint idea at first, the thought that you could listen to your favorite SW broadcaster while typing a letter on your computer. But now that quaint idea threatens to not only kill a time-honored hobby, but to drastically reduce or limit listening opportunities. Who takes their computer with them out to the deck, the beach, or in their car? Yet, these broadcasters have the nerve to insist that the N. American listening audience will still be "served" via this new medium. To date, rumors are afloat concerning such European giants as Swiss Radio International and Radio Austria. It has now come to my attention that the BBC intends to follow suit, starting this summer. This has been reported by both VOA and Radio Netherlands. In each case, the thinking is the same: Since coverage is available via the internet, and since most people who would be interested seem to have internet access, there is little need to actually broadcast to our market. With such major European powerhouse stations as these discontinuing coverage to the U.S. market, I'm sure you can see that it's only a matter of time before all that's left are the domestic religious and political fringe group broadcasters.

You have a vested interest in these developments. *Your* readers are being affected. *Your* editorial staff could be writing stinging columns about the woefully myopic vision of these international broadcasters. Please, before it's too late, come out *strong* and *often* in print against these stations. Tell it like it is. Negative publicity may not do the trick, but it's pretty obvious that no publicity will only perpetuate the problem. Thank you.

Tim Manwell (via e-mail)

Tim: Since CQ's primary focus is on amateur radio, we haven't been paying close attention to what's going on in the world of international broadcasting (on the other hand, our colleagues at Popular Communications *are constantly on top of that). We do support SWLing, though, as an integral part of the radio hobby, and would be distressed to see major international broadcasters switching over entirely to internet broadcasting. They have some good arguments on their side, of course, such as lower costs and no propagation worries. On the other hand, your arguments carry equal weight and I don't think we could put them any better.*

Don't Pre-Program Those Memories!

Editor, *CQ:*

Just finished my May *CQ*. I must take exception with a "suggestion" made in the review of handhelds. It was suggested that the dealer should program them to local frequencies, so newcomers don't have to figure it out.

Have we come down so low that we must program a handheld for someone that supposedly passed a license exam? I have watched the "dumbing down" of not only Ham Radio, but the a lot of other areas with great dismay. I am sorry, and I am sure will be labeled an "old-fuddy-duddy" for suggesting that if a new ham is too dumb or too lazy to learn how to program his own handheld, maybe we don't want him on the repeater, or elsewhere on the air.

On the other hand, disregard the "I am sorry." I'm not.

John L. Sielke, W2AGN (via e-mail)

John: The article specifically said that all new hams should learn how to program their handhelds, but suggested that the dealers help get them started by pre-programming a few local repeater, weather, and public-service frequencies. It whets the appetite. Besides, there's nothing in any level of amateur license exam on how to program your radio. Perhaps there should be!

Tuning Pretuned Antennas

Editor, *CQ:*

I just wrote e-mail to Dave Ingram regarding his article in May *CQ* on pretuned antennas. Back in 1956, before I was even a ham, I made myself available to hams to help get their antennas "into the ball park" with my grid dip meter. At the time I was enrolled in a technical institute, which had a Boonton Q meter in the lab which enabled me to build loading coils and traps for the guys. Now I own the MFJ Antenna Analyzer, and can help colleagues get the antennas resonant. Dave has written many articles over the years to help all of us to do a more complete job, easier with his experience and his writing ability! My best to the entire *CQ* team.

George Ficklen, KB4VIS/AAR3FQ (via e-mail)

Grid Squares Exchange

Editor, *CQ:*

I am writing in response to an article that appeared in the June 2001 issue. First, let me say that as an avid six-meter operator, I was very pleased to see an issue heavily laden with VHF material. Looking over the cover and Table of Contents, I was especially intrigued with the article concerning six-meter DXpeditions. I read the introduction and both of the feature articles. Unfortunately, before I finished the second feature, "A Six Meter DXpedition to Barbados During the Summer Sporadic-E Season" (page 38) my enthusiasm was gone, replaced by altogether different emotions.

I was truly appalled and angered by the authors' attitude regarding grid squares. How can a pair of operators take on the challenge of six-meter DX operations and yet fail to understand the importance of grid squares? To VHF operators, a QSO is not considered complete until both operators exchange callsign and grid locator. Signal reports are optional in the VHF world, but grid squares are mandatory. As the author noted, the grid locator is on the card (well, sometimes), but that isn't the point. VHF etiquette requires the proper and complete exchange.

To authors K4BI and K2ZD, I suggest that in the future, instead of griping about people requesting information, how about you simply provide it in the first place. That way, people won't waste your valuable time and deprive many stations of a new country, as you so eloquently complained in your article.

Tim Gardner, N9LF, EN60nj, (via e-mail)

Tim: Exchanging grid squares during a QSO is certainly common practice, but hardly a requirement of a "complete" QSO, especially in marginal conditions. Standard procedure for meteor scatter QSOs, for example, is exchanging callsign and either grid square or signal report (see this month's "VHF Plus" column). I am not aware of any VHF award program that requires an on-air exchange of grid squares in order for a QSO to "count." As long as the grid is on the card, it's considered valid. The authors preferred to give out more QSOs than spend time repeating grid square info during brief openings.

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Results of the 2000 CQ WW DX SSB Contest

BY BOB COX,* K3EST

The year was 2000 and it was time for the 53rd annual CQ WW DX SSB Contest. From all over the planet, contesters prepared for the starting bell.

The bands were wide open and the sunspots were high. Over 30,000 contesters with varying degrees of skill and experience would make contacts in the 2000 contest. It began with record-setting conditions on 40 through 10 meters. The high bands were open long and deep into the night. The race was on for everyone to increase their personal-best score. After 24 hours it was apparent that many of the high-score goals that had been set might have a chance of being realized.

Only 160 meters provided a harbinger of what Sunday would bring. One-sixty was almost completely closed from the U.S. to Europe the whole weekend. On late Saturday night solar flares hit the earth and conditions dropped considerably. However, one entrant's reduced conditions is another's increased opportunity. The major activity switched from east-west to more north-south. In one 48-hour period the best conditions and poor conditions made for a fun, challenging contest. When all the submissions were tallied, there were about 4000 from 175 countries! Whether you had a small log or a world-winning log, here in the published results, you can see how you did and make plans for the 2001 CQ WW contests.

All Band

Sitting in the mists of an ancient mountain volcano on San Cristobal island of HC8 is a station that was built up from nothing a few years ago. Now after much hard work by a dedicated core of ops, the HC8 mega-station has emerged. Far away in Fresno, California, Rich, N6KT, had spent many hours poring over his past HC8A logs and devising a game plan to win the CQ WW SSB. Arriving a week early to make sure all was okay at HC8A, he quickly passed out QSOs to gather information about band conditions. His hard work paid off, as Rich scored 18+ million points and took top world honors.

Using the approaching long northern nights of Finland to best advantage, Pekka, OH1RY, had been busy planning last-minute repairs to EA8AH, where he would operate for the contest. Located on a promontory with water in all important directions, the EA8AH station is located in a windowless room of a water processing plant. This station has been the location of top-scoring contesters for many years. In the 2000 WW SSB Pekka, EA8AH, took world second place.

It seems that islands were the place to be. The contest saw eight of the top world scorers operating from an island. You cannot get farther from an island, figuratively speaking, than Kansas. That is where Tom, W2SC (8P1A), jumped on a plane, ending up in Barbados. Aside from being a beautiful place, Barbados is also a great place to hear radio signals. Tom put 8P1A into lots of logs, taking third place world.

Another world traveler, José, CT1BOH, was looking for something a little different. He contacted another island mega-station, KH7R, and soon was making plans for an Oceania effort. Oceania is a tough place from which to do well on a worldwide level. When conditions are good, you are off the back or side of all NA/JA beams and Europe is *far* away. None of these obstacles seem to have bothered José, who as KH7R talked his way to fourth place world and a new Oceania record.

In the U.S., Bob, KQ2M, has been building up his station to its present level over many years—first wires and now he has Yagis. With his station he talked his way to the #1 position in the U.S. Following in second place was Potomac Valley Radio Club member Ken, K4ZW, located in Stafford, northern Virginia. What a fine debut into the top three. Third place U.S. went to Steve, N2IC, operating from W4AN's QTH in Georgia.

The top three European scores were all from OHØ/OH. Coming out on top was Ari, OH1EH, operating from the OHØZ station. The name of the game has always been Qs, Qs, Qs. Ari sure concentrated on putting them in his log, finishing over a 1000 Qs ahead of the second-place score, which was turned in by OHØBH operated by Ilkka, OH1WZ. Ilkka had 101 more mults than the first-place finisher. Third place went to OH2BH operated by Timo, OH1NOA.

Low Power

Low power is the most popular category. Each year it attracts more and more participants eager to see how they will stack up against others using only 100 watts. Many entrants have commented on how well one can do with only 100 watts. Just like all other power categories, how well you do depends on where your QTH is located, how good your antennas are, and your personal skill level.

This year the world top score was made by Robert, W5AJ, operating P40P. His score was not only good enough to win the trophy, it set a new low power record. Not far behind, also

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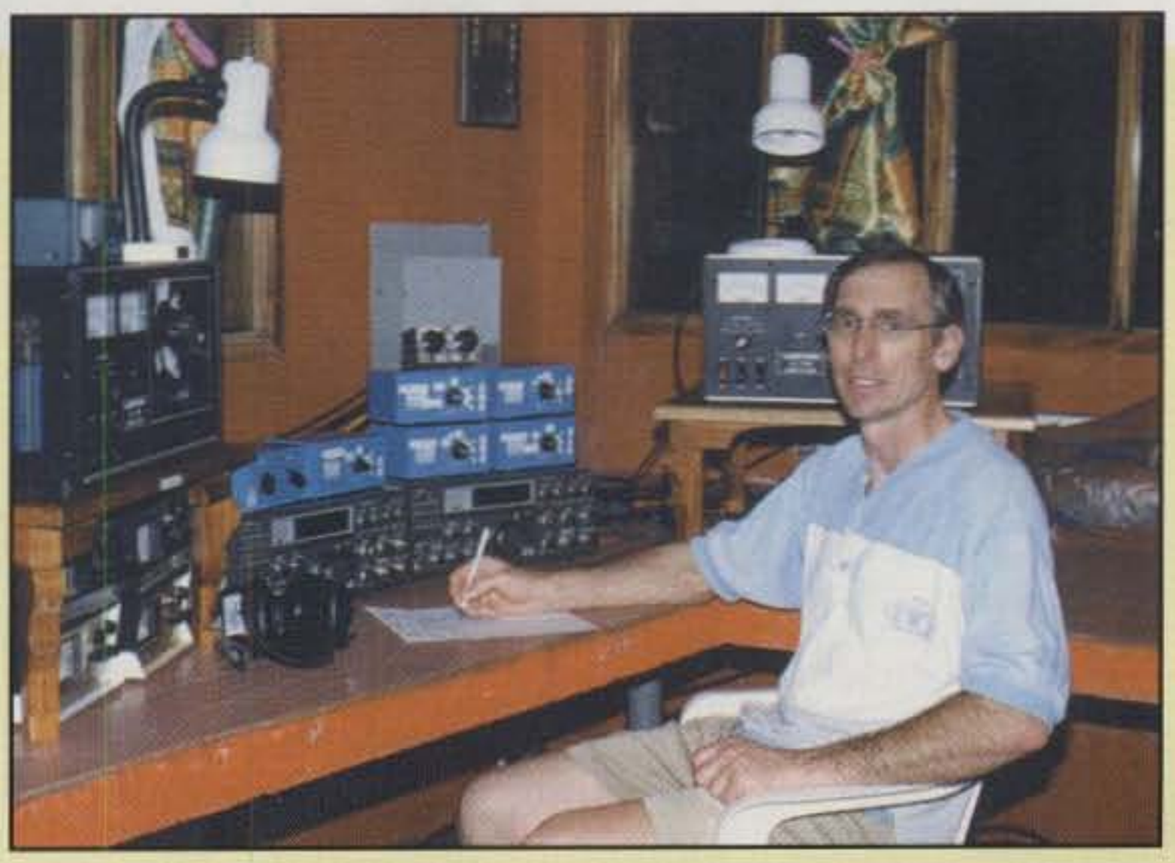
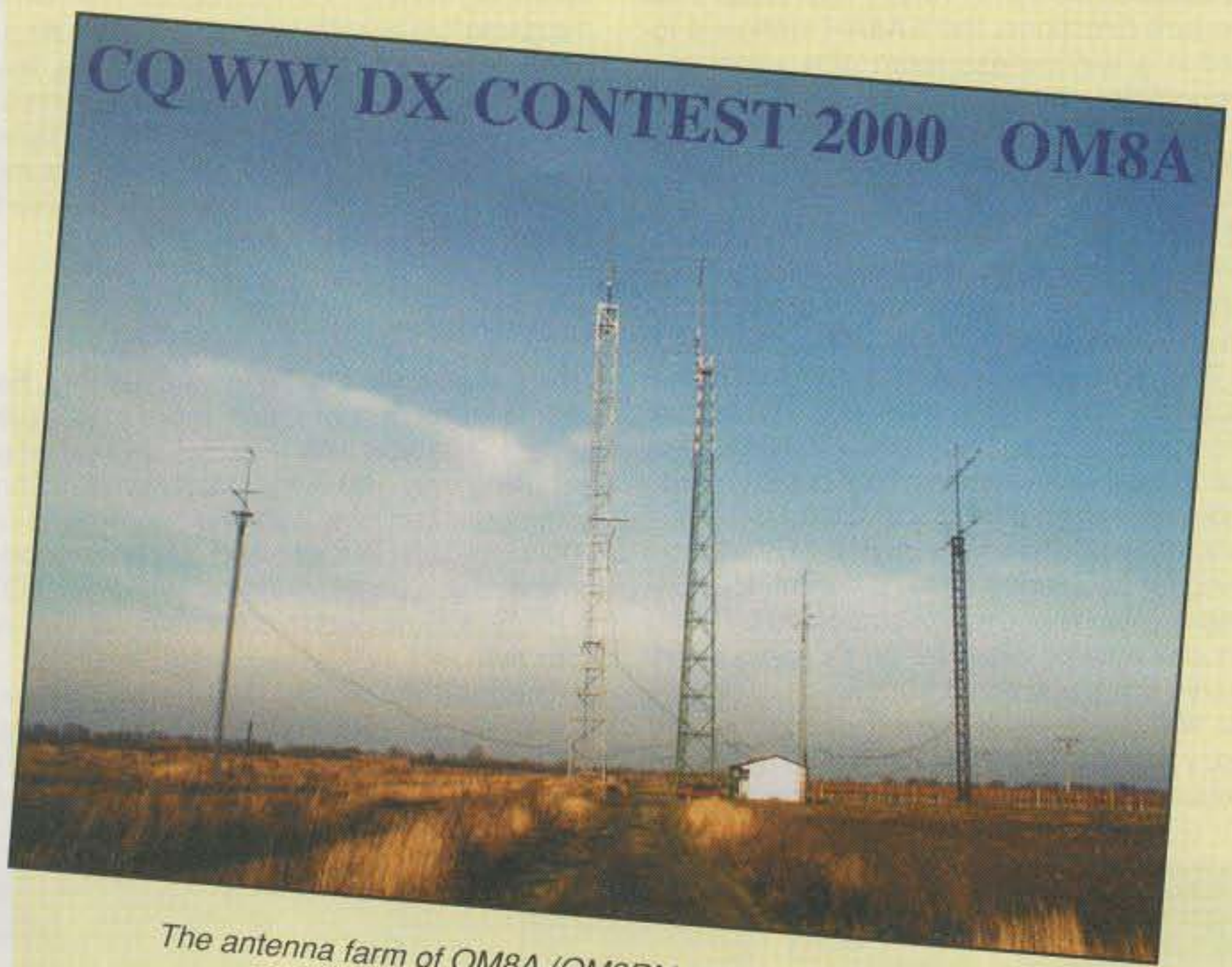
e-mail: <k3est@cqww.com>

P40A (KK9A op), #1 world 14 MHz.



HC8A (N6KT op), #1 world Single Op, All Band.

NT4TT operated multi-single from the QTH of Joe, N4ZIQ. Shown left to right at the breakfast table are Blake, N4GI; Tom, KC4SSN; Joe, NR7Z; and Leo Reilly.



The antenna farm of OM8A (OM3RM op), #4 Europe All Band.

breaking the old record and setting a new African record, was SU9ZZ. Jaro usually can be found high in the band handing out double multipliers to the deserving. Third place in the world was Emily, P43E. Emily also won the YL world high score trophy.

In Europe, Steve, GW4BLE, decided that after years of high power finishes he would try his hand at low power. Steve certainly made the right decision. He finished #1 in Europe and set a new European low power record, no easy task. Second place went to a station located farther to the east, where Bogdan, SP3RBR, operated SQ6Z. Third place went to Valentin, S53EA.

In the U.S., Jeff, K1ZM, not only took first place, he also managed to set a new U.S. low power record in doing so. Second place went to Charles, NF4A, putting his station in the Florida panhandle to good use. Third place went to K8PO/6 (a great job!).

QRP

QRPers are a dedicated group. Their contest operation is different from that of their low and high power friends. It consists of patience and choosing the right moment to work someone. Searching and pouncing is a way of life to a QRPer. S&Ping is a very good way to learn about conditions, your own skills, and tuning.

The 2000 contest attracted 129 entrants to this tough category. John, P40W (W2GD), went to Aruba with the intention of trying to break the QRP world record. He succeeded by nearly 2 million points, raising the world record to 5.09 million—quite an accomplishment. Putting Puerto Rico on the QRP map by setting a new North American QRP record and finishing in second place world was Tony, KP4KE. Third place world and #1 U.S. went to the new U.S. QRP record holder, Doug, KR2Q. This is not an unfamiliar place for this long-time QRPer.

To make 1 million points from the U.S. east coast is tough, but from the west coast it is herculean. That was the score turned in by John, N6MU, #2 U.S. and #5 world. A special mention must be made of the fine job done by Rich, NØHJZ, from the black hole—#3 U.S. and #10 world. First place in Europe and #4 world went to the fine effort of Gerard, F5BEG. He was followed in second place by Danius, LY1DT, and third place Phil, ON/NØØKE, at the QTH of ON4IZ. The #1 Japanese score was achieved by Masayoshi, JR4DAH, who set a new JA QRP record. A long way from QSOs, LU1VK turned in a FB effort in spite of QRN.

Assisted

Winning a world category is no easy task. Winning it from A61AJ is a real accomplishment. That is what Frank, DL2CC, did on his way to setting a new Asian assisted record. Taking the 6 hour trip to the U.A.E., Frank put the Dubai internet connection to good use. Second place world and #1 Europe went to OTØT operated by Mark, ON4MA, at ON4UN's QTH. The next three world positions went to U.S. stations. At the top of the U.S. assisted list was KI1G, who edged out Charles, K3WW, #2 U.S., and Noah, K2NG. Finishing #2 in Europe was YT7R operated by Robert, YU7BW, while third place Europe went to Andy, F6GYT, operating F6KRC. Special mention should be made of the efforts of JJ3ZZE and BA4DW.

There seems to be some confusion out there about what assisted means (please read the *entire* rules pertaining to this category). It means that you (one person) can *only* use information via a DX spotting net or packet system. You *cannot* have another person help you spot, work multipliers, or make any QSOs for you. This means you must act completely alone except for the use of a DX spotting system. Assistance means *only* that a DX spotting net can be used.

Multi-Single

Overlooking a cliff on southwest Cyprus is the QTH used by the P3A team. Most of the team had traveled from Asiatic Russia to a QTH that has some real locational advantages. They have built up the station over the last few years so that now P3A is a formidable competitor. This year was no exception. They finished #1 in the world, edging out another well-constructed station in Brazil, ZW5B. If you check out the band-by-band breakdown of each station, you can see how close the scores were.

There was also a battle on VP5 for multi-single dominance. After the final bell, VP5L operated by a team from Norway took world #3, beating out VP5DX from the NFDXA. The #1 Europe position was reclaimed by IQ4A. A few years ago they lost part of their rented land, but they have rebuilt the station. Second place

TOP SCORES

WORLD

All Band

HC8A	18,122,040
EA8AH	13,965,672
8P1A	12,136,203
KH7R	11,894,730
D4A	10,911,021
CT3BX	10,830,688
P4ØB	10,450,656
9K9X	9,802,784
3V8BB	9,358,911
C4A	9,351,091

28 MHz

ZX5J	3,008,866
ZS6EZ	2,734,464
5X1Z	2,729,610
KP2A	2,623,330
EA9LZ	2,510,943
CE3F	2,170,084

21 MHz

PY5M	2,439,954
V8A	1,773,756
JY9NX	1,706,550
TI1C	1,583,400
C4W	1,375,611
9A3GW	1,283,652

14 MHz

P4ØA	1,923,646
9Y4NZ	1,757,349
DJ7AA	1,494,896
LU4FM	1,065,843
S59A	1,061,487
OH8L	1,006,360

7 MHz

PYØFF	575,910
S52O	287,670
KP2/K1VW	277,290
9A5Y	273,762
YT7A	238,544
KH6FKG	161,840

3.7 MHz

F6CTT	237,393
YTØA	219,112
3ZØMM	182,928
4N1A	142,584
ZF2MC	123,525
K1LZ	118,260

1.8 MHz

SV8CS	69,660
OZ3SK	47,590
SP7VC	52,992
RU9TC	47,100
SM6DOI	35,295
UA9AT	24,354

Low Power
All Band

P4ØP	8,747,520
SU9ZZ	8,209,349
P43E	5,440,770
GW4BLE	4,529,292
HC1OT	4,294,830
ZX2B	3,832,812
SQ6Z	3,599,145
K1ZM/2	3,368,010
S53EA	3,314,044
XQØY	3,189,132

28 MHz

HC1JQ	1,158,488
TI5WFM	1,077,846
TA3D	1,065,946
LU4DX	1,003,704
LU3HIP	958,782
HK3JJH	802,169

21 MHz

9E1C	1,408,064
AY1I	1,396,415
XE1CRO	812,592
PY2P	789,150
IR5T	698,202
LU2BA	621,639

14 MHz

VK4EMM	667,056
IT9STX	600,935
T92D	545,400
LOØD	519,367
9A3B	506,890
IQ7A	466,830

7 MHz

TA3J	171,535
FK8GM	140,580
S54A	66,759
SV1DKL	62,720
RA9JP	40,640
AX3TZ	36,096

3.7 MHz

EU1AZ	72,048
S53F	48,300
YU1ACS	42,408
LY40FW	41,331
OK1FPS	33,957
OK2PJW	28,846

1.8 MHz

S57NMQ	17,985
UX5NQ	17,160
4N7ZZ	15,984
SP9RPW	9,504
G4VGO	8,865
YO2BEH	7,964

QRP
All Band

P4ØW	5,097,780
KP4KE	2,027,706
KR2Q	1,507,506
F5BEG	1,138,936
N6MU	1,020,936
LY1DT	963,356
ON/NØKE	756,958
LY2FE	668,338
JR4DAH	621,160
NØHJZ	537,716

Assisted
All Band

A61AJ	10,995,416
OTØT	6,654,636
KI1G	6,092,863
K3WW	5,885,100
K2NG	5,593,346
KS1L	5,396,475
YT7R	5,237,680
K2XA	4,869,282
F6KRC	4,463,970
OH6RX	4,391,442

Multi-Operator
Single Transmitter

P3A	17,409,816
ZW5B	17,014,752
VP5L	14,009,904
IQ4A	13,581,494
VP5DX	12,595,385
RU1A	11,679,388

Multi-Operator
Multi-Transmitter

CN8WW	78,170,508
IG9A	50,742,692
IH9P	41,762,574
V26B	33,938,394
VE3EJ	26,396,325
J3A	24,983,360

USA

All Band

KQ2M/1	6,081,879
K4ZW	5,688,640
W4AN	5,622,732
K4XS	5,351,048
W9RE	5,287,976
N2NT	4,801,572
K3ZO	4,505,614
W6AX	4,431,712
N2LT	4,166,856
W3BGN	3,867,552

28 MHz

W4ZV	1,304,873
K5RX	912,890
W2RE	911,904
K3RV/4	845,556
W6NL	834,720
K1RO	793,854

21 MHz

K2SS/1	1,257,792
W7WA	951,018
K3EST/6	931,516
NN4T	888,740
W2FU	700,785
N4CT	534,650

14 MHz

K4ISV	734,558
KS7O/4	438,472
K1QS	261,284
W5FO	247,623
KKØSS	174,113
W1ZK	163,449

7 MHz

KE4SCY	64,310
NØRA	40,800
KØKX	36,955
NC4NC	25,800
K4TX	15,642
K9CJ	4,608

3.7 MHz

K1LZ	118,260
W6RJ	116,280
N4UK	87,238
K3SV	24,080
W5OB	20,960
N6BU	15,925

1.8 MHz

W2VO	5,500
W7ACD	915
AA4MM	775
K5ZD/1	736

Low Power
All Band

K1ZM/2	3,368,010
NF4A	1,973,760
K8PO/6	1,973,075
NA2U	1,926,320
W2TZ	1,817,712
KVØQ	1,726,041
K1VUT	1,617,270
KQ3V	1,505,787
W1CTN	1,452,752
KS1J	1,391,104

28 MHz

N2EE/4	722,232
K4WI	644,499
WE1USA	454,817
K7JA/6	405,748
WA7BNM/6	383,295
K4UCF	376,464

21 MHz

WC6H	286,800
N4MO	230,005
N6WS	228,138
KK7JS	225,592
W1EL	204,400
NG3Q/8	185,000

14 MHz

KU6T	36,491
N7FYT	30,268
KC8LMG	28,106
AB8JR	24,360
KG9X	18,150
N8WDH	10,296

7 MHz

W6YJ	16,244

3.7 MHz

K8DO	2,288

QRP
All Band

KR2Q	1,507,506
N6MU	1,020,936
NØHJZ	537,716
WK2G	488,592
WØMHK/2	307,639
N1TM	286,512
KKØQ	241,744
NM1K	63,694
N2WG	53,515
N9CIQ	35,682

Assisted
All Band

KI1G	6,092,863
K3WW	5,885,100
K2NG	5,593,346
KS1L	5,396,475
K2XA	4,869,282
W1GD/2	3,899,705
AA3B	3,772,680
KQ3F	3,408,330
K3PP	2,988,600
W4NF	2,804,262

Multi-Operator
Single Transmitter

K1AR	9,799,092
K5MR	9,046,637
W2A	8,889,616
N2NU	8,058,888
K4JA	7,351,132
K8AZ	6,488,910

Multi-Operator
Multi-Transmitter

KC1XX	20,691,530
K3LR	20,008,190
W3LPL	18,194,336
K9NS	14,482,776
N3RS	11,891,996
W4MYA	11,041,326

EUROPE

All Band

OHØZ	8,506,505
OHØBH	7,447,794
OH2BH	6,156,507
OM8A	5,614,688
S5ØA	5,574,590
DL2NBU	5,297,160
LY7Z	4,828,784
DL4NAC	4,809,260
DJ4PT	4,724,028
LY6M	4,470,060

28 MHz

9A1A	1,835,778
GIØKOW	1,641,046
OK1RI	1,549,084
CT8T	1,357,620
S58D	1,223,620
9A4X	1,217,485

21 MHz

9A3GW	1,283,652
SN2B	1,130,025
OH1F	986,812
S53R	951,954
OK1RF	948,752
IK2DUU	857,140

14 MHz

DJ7AA	1,494,896
S59A	1,061,487
OH8L	1,006,360
9A6A	912,582
S58A	883,282
YT1BB	654,318

7 MHz

S52O	287,670
9A5Y	273,762
YT7A	238,544
SM6DER	113,190
LY3BX	102,585
9A6K	99,852

3.7 MHz

F6CTT	237,393
YTØA	219,112
3ZØMM	182,928
4N1A	142,584
DL3LAB	86,760
OH2BEN	61,232

1.8 MHz

SV8CS	69,660
OZ3SK	47,590
SP7VC	52,992
SM6DOI	35,295
EO6F	23,954
OK1TP	21,043

Low Power
All Band

GW4BLE	4,529,292
SQ6Z	3,599,145
S53EA	3,314,044
CT1DSC	3,023,524
LY4ØBA	2,285,716
ER6A	2,079,195
HA1CW	1,896,528
RU3QW	1,865,875
LY4ØBM	1,553,500
9A7P	1,471,527

28 MHz

CT1AOZ	739,028
YU1ZZ	685,520
9A7D	665,280
SW2A	626,580
OHØV	611,600
F5TDK	552,808

21 MHz

IR5T	698,202
S57IIO	546,930
GM4FDM	508,536
GI4SNA	458,458
EI6FR	392,657
OTØH	389,070

14 MHz

IT9STX	600,935
T92D	545,400
9A3B	506,890
IQ7A	466,830
9A7DM	286,014
DF7YU	270,240

7 MHz

S54A	66,759
SV1DKL	62,720
RN3FX	35,424
RW3DU	31,527
SP3CCT	28,080
T9ØU	27,032

3.7 MHz

EU1AZ	72,048
S53F	48,300
YU1ACS	42,408
LY4ØFW	41,331
OK1FPS	33,957
Z35A	31,570

1.8 MHz

S57NMQ	17,985
UX5NQ	17,160
4N7ZZ	15,984
SP9RPW	9,504
G4VGO	8,865
YO2BEH	7,964

QRP
All Band

F5BEG	1,138,936
LY1DT	963,356
ON/NØKE	756,958
LY2FE	668,338
SM3C	483,144
YU1KN	460,368
UU4JO	459,868
YU1LM	458,126
S59D	386,568
YO8WW	331,004

Assisted
All Band

OTØT	6,654,636
F6KRC	4,463,970
OH6RX	4,391,442
YL8M	4,269,843
EM3J	4,198,230
RW3QC	3,988,422
SK3W	3,895,344
DJ2YA	3,627,750
OK2FD	3,614,423
S5ØR	3,590,615

Multi-Operator
Single Transmitter

IQ4A	13,581,494
RU1A	11,679,388
ZB2X	11,199,232
9A7A	10,153,116
F6BEE	9,174,910
OK5W	9,023,670

Multi-Operator
Multi-Transmitter

M6T	23,968,284
RW2F	21,395,826
OH2U	20,655,910
OTØA	19,281,152
DFØHQ	18,548,716
HG6N	17,819,120

Europe was taken by the RU1A team from near St. Petersburg. Rounding out the top three was ZB2X, a multi-national team operating from a house in Gibraltar.

The #1 U.S. spot went to K1AR operating from K1EA's station. What can you say about their efforts over the years which has not already been said? It was a great job. They were given a scare by the team from K5MR; what a great job was done by the boys from Texas. An ice storm and winds this past winter, however, severely damaged K5MR. Let's hope they get the station up and running again. Third place U.S. went to W2A operating from a small city lot; they put their talent to best use. In Japan, JH7PKU beat out JE4VVM to set a new Japanese record. Look at their line scores to see how close the competition really was.

The multi-single category has a lot of operator participation. Not only is it fun to get together with your friends, this category provides fer-

TROPHY WINNERS AND DONORS

SINGLE OPERATOR
World All Band
HC8A (Opr. Richard Smith, N6KT)
Donor: Dave Rosen, K2GM
WA2RAU Memorial

World Low Power
P40P (Opr. Robert Wood, W5AJ)
Donor: Slovenian Contest Club

World QRP
P40W (Opr. John Crovelli, W2GD)
Donor: Doc Sayre, W7EW

World Assisted
A61AJ (Opr. Frank Grossmann, DL2CC)
Donor: Snake River Contest Club

U.S.A
Robert Shohet, KQ2M
Donor: Potomac Valley R.C.
KC8C Memorial

U.S.A. Low Power
Jeffrey Briggs, K1ZM
Donor: North Coast Contesters

U.S.A. Zone 3
W6AX (Opr. James Pratt, N6IG)
Donor: Bill Fisher, W4AN

U.S.A. Zone 4
Michael Wetzel, W9RE
Donor: Bill Fisher, W4AN

Canada
David Dudley, VE3OI
Donor: Niagara Frontier Int'l DX Association
VE3WT Memorial

Caribbean/C.A.
8P1A (Opr. Tom Georgens, W2SC)
Donor: Alex M. Kasevich, VP2MM

Europe
OHØZ (Opr. Ari Korhonen, OH1EH)
Donor: Potomac Valley R.C.
W4BVV Memorial

Europe Low Power
Steve Cole, GW4BLE
Donor: Scott Jones, N3RA & Tim Duffy, K3LR

Russia
RD4M (Opr. Vladislav Kousminykh, UA4LU)
Donor: Roman Thomas, RZ3AA

Africa
EA8AH (Opr. Pekka Kohehmainen, OH1RY)
Donor: Gordon Marshall, W6RR

Asia
9K9X (Opr. Hamad Al-Nusif, 9K2HN)
Donor: 2 AM Dayton Pizza Gang

Japan
Satoshi Hara, JH5FXP
Donor: Japan Crazy Contesters Club

Japan Low Power
Nobuhiro Iwasa, JH8SLS
Donor: Western Washington DX Club

Oceania
KH7R
(Opr. Jose Carlos Cardoso Nunes, CT1BOH)
Donor: Northern California DX Club

South America
P40B (Opr. Jacobo Oduber, P43P)
Donor: Yankee Clipper Contest Club

South America-Mainland
PZ5JR (Opr. Olli Rissanen, OHØXX)
Donor: Jose L. Bachmann, ZP6CC
& Cesar Ivaldi, ZP5K

SINGLE OPERATOR, SINGLE BAND
World – 28 MHz
ZX5J (Opr. Sergio Lima de Almeida, PP5JR)
Donor: Joel Chalmers, KG6DX

World – 21 MHz
PY5M (Opr. James Neiger, N6TJ)
Donor: Robert Naumann, N5NJ

World – 14 MHz
P40A (Opr. John Bayne, KK9A)
Donor: North Jersey DX Assn. – K2HLB Memorial

World – 7 MHz
Andre Sampaio, PYØFF
Donor: Fred Laun, K3ZO – K7ZZ Memorial

World – 3.7 MHz
Joseph Cornee, F6CTT
Donor: Fred Capossela, K6SSS

World – 1.8 MHz
Spyros Cheimarios, SV8CS
Donor: Robert Wruble, W7GG

USA – 28 MHz
Bill Tippett, W4ZV
Donor: Donald Thomas, N6DT

USA – 21 MHz
David Donnelly, K2SS
Donor: Worldradio

USA – 14 MHz
Elza Foster, K4ISV
Donor: Southern California DX Club

USA – 7 MHz
Stewart Dunaway, KE4SCY
Donor: Stanley Cohen, W8QDQ

USA – 3.7 MHz
Kassimir Petkov, K1LZ
Donor: Arnold Tamchin, W2HCW

USA – 1.8 MHz
Ronald McClain, W2VO
Donor: Worldradio

Carib./C.A. (28 MHz)
KP2A (Opr. Robert B. Hayes, KW8N)
Donor: Snake River Contest Club

Europe – 28 MHz
9A1A (Opr. Zdravko Balen, 9A9A)
Donor: Worldradio

Europe – 21 MHz
Robert Orehoci, 9A3GW
Donor: Tine Brajnik, S50A

Europe – 14 MHz
Wilfried Gottschald, DJ7AA
Donor: A. G. Anderson, GM3BCL

Europe – 7 MHz
S52O (Opr. Romeo Rabic, S52RU)
Donor: Roger Burt, N4ZC

Europe – 3.7 MHz
YTØA (Opr. Branko Drljaca, YU1FW)
Donor: Marconi Contest Club – I3MAU Memorial

Europe – 1.8 MHz
Egon Julius Gadeberg, OZ3SK
Donor: Robert Kasca, S53R

Oceania (21 MHz)
V8A (Opr. Hajime Kato, JO1RUR)
Donor: Bruce D. Lee, KD6WW

Japan – 21 MHz
Katsumi Furukawa, JH7XGN
Donor: DX Family Foundation

Japan – 14 MHz
Toshihiro Ishibashi, 7M4BEN
Donor: Take Yokoyama, JL1BLW

MULTI-OPERATOR, SINGLE TRANSMITTER
World
P3A (Oprs: RA9JX, RZ3TX, UA9YAB, RZ9UA, RU3DX, UT7SF, UA9UHD)
Donor: So. Calif. DX Club – W6AM Memorial

U.S.A.
K1AR (Oprs: K1AR, K1EA, K1DG, K5ZD, N5KO, W4AN)
Donor: Carolina DX Association

Carib./C.A.
VP5L (Oprs: LA4DCA, LA5KO, LA9HW)
Donor: Eric Scace, K3NA

Japan
JH7PKU (Oprs: JH7PKU, JA9SSY, JF2IWL, JQ1UKK, JR5KDR)
Donor: Vienna ARC – 4U1VIC

Asia
UPØL (Oprs: UN9LW, UN7LAN, UN9LO)
Donor: Edward L. Campbell, NT4TT

Europe
IQ4A (Oprs: I4TJE, I4IND, I4IKW, I4EAT, IK4OCT, IK4XQH, IZ4BOY, I4JUB, I4VEQ, IK4MGP, IK4CZF, IK2ULH, IK2QPR, IZ2AHF, IV3YYK)
Donor: Bob Cox, K3EST

Oceania
AH2R (Oprs: JG3RPL/N1BJ, KH2/JR3RVO, JI3ERV/NH2C, KH2/JR8VSE, KH2/JR8PPG, JR7OMD/WI3O, KH2/JH7QXJ, KH2/JE8KKX)
Donor: Junichi Tanaka, JH4RHF

South America
ZW5B (Oprs: PY5EG, PY5CC, PY5GU, PY2KC, 4X6TT, LU6ETB)
Donor: Victor Burns, KI6IM

South America – Mainland
FY5KE
Donor: Tomas Zappini, ZP5AZL &
Renato Bellucci, ZP5XF

MULTI-OPERATOR, MULTI-TRANSMITTER
World
CN8WW (Oprs: DL8WPX, DK7YY, DL8OH, S50S, DL1MAJ, DK6WL, HAØDU, DK4VW, DJ7ED, DL4MCF, DL6RAI, DJ9KV, DL1IAO, DH1SGS, DL2MEH, DL6FBL, DL1MFL, DL1MGB)
Donor: W6NL & K6BL

U.S.A.
KC1XX (Oprs: KC1XX, KB1AWE, AD1C, KD1EA, KC1F, W1FV, K1GQ, KM3T, K6AW)
Donor: Paul Hellenberg, K4JA

Europe
M6T (Oprs: G4IFB, G4VXE, WW2R, OH6YF, GØIVZ, GØMTN, G4PIQ, G4VMM, GØCYB, G4BUO, G4TSH, G4BWP, GØKRL, GØAEV, G4BAH, GØAFH, GØWCW, G7OCD, GØOZS)
Donor: Finnish Amateur Radio League

Japan
JA3YBK (Oprs: JH3PRR, JG3KIV, JI3OPA, JM3XKG, JH4NMT, JR4ISF, JF4FUF, JP1NWZ, WV9T)
Donor: Ryozo Goto, JH3JYS

Contest Expeditions
World Single Operator
D4A (Opr. Alberto Annesi, IV3TAN)
Donor: National Capitol DX Assn. –
Stuart Meyer, W2GHK Memorial

World Multi-Single
VP5L (Oprs.: LA4DCA, LA5KO, LA9HW)
Donor: Dieter Loffler, DK9KD
DJ3NG & DJ4EI Memorial

World Multi-Multi
IG9A (Oprs: I4UFH, I4JMY, IK4UPB, I4YSS, I4AVG, I4KLY, I2EOW, IK2NCJ)
Donor: Tachio Yuasa, JA9VDA

World – All Band Under 21 years old
Hamilton Oliveira Martins, PY2YU
Donor: Gene Zimmerman, W3ZZ

World All Band High YL
Emily Thiel, P43E
Donor: Yutaka Tanaka, JH3DPB

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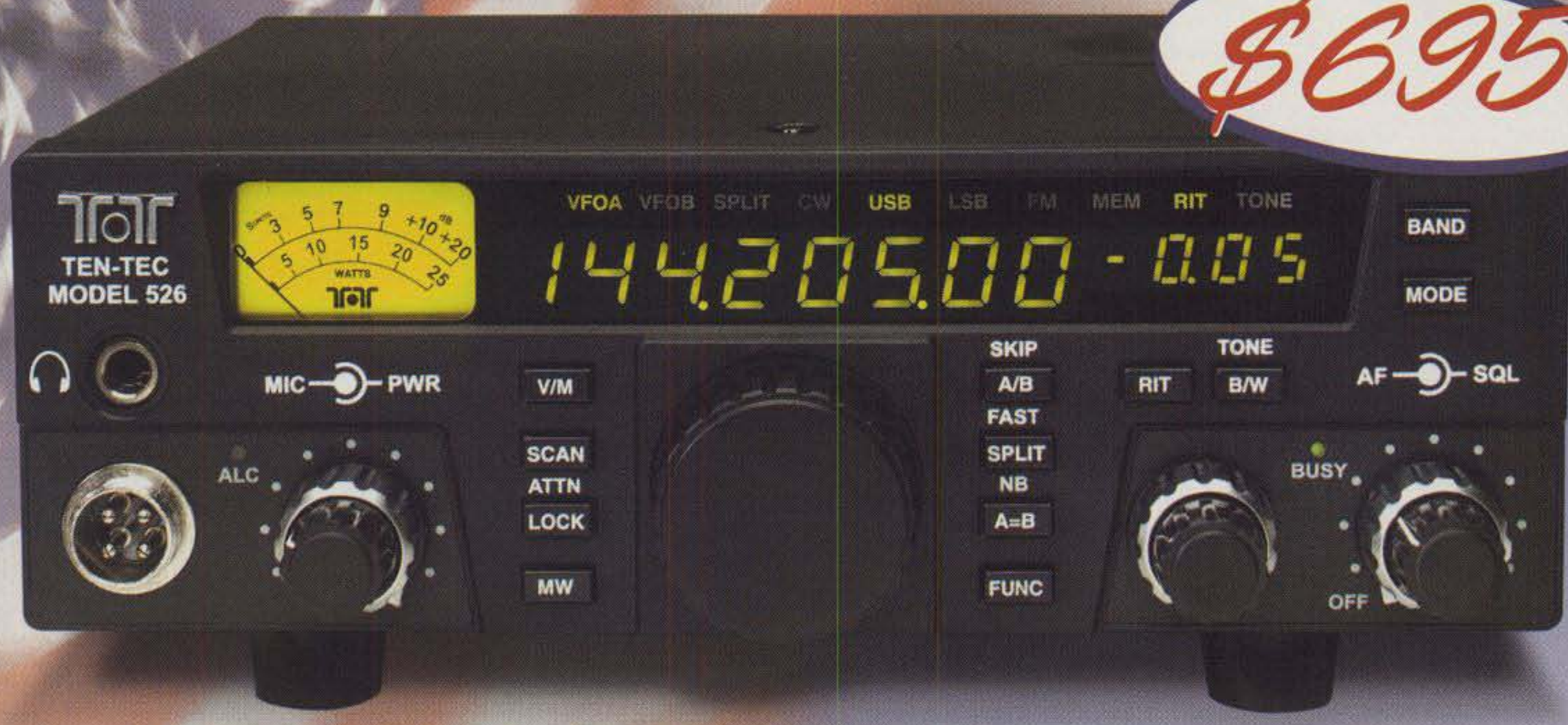

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Real innovation in a multi-mode VHF transceiver was long overdue. Introducing the Ten-Tec model 526 "6N2" VHF transceiver. Amateur radios' first IF-DSP multi-mode VHF rig. For a long time, there have been no affordable choices for either 6 or 2 meters in a single band VHF multi-mode transceiver. Active hams planted the idea with us - why not offer a single rig that has BOTH 6 and 2 meters, without sacrificing performance? Multi-mode HF/VHF rigs have been around for years, at over a thousand dollars and with compromised performance on the VHF bands at best. The "6N2" provides serious multi-mode VHF performance in a small, take-anywhere package at a significantly lower price than HF/VHF multi-mode transceivers. Why buy another HF rig to get VHF coverage, when you already own one?

Ten-Tec's years of experience designing DSP radio equipment for amateur, commercial, and military applications comes together to deliver a VHF multi-mode transceiver to meet performance demands of weaker signal VHF operators. Let's take a look:

- SSB, CW, and FM transceive operation on both 6 and 2 meters. Extended receive range from 136 - 174 MHz on 2 meters.
- 35 IF-DSP bandwidth filters are built in. No extra filtering to buy! Instantly select the best one for band conditions with the twist of a knob.
- Can be used as your main 2-meter FM rig. 100 memories, repeater splits, CTCSS tone encode are all built in. Memories will retain mode, tone, and split information. You can even program (and scan!) memories for different modes. Memory lockout function allows skipping constantly busy channels while scanning.
- Two SO-239 antenna connectors, one per band, allow you to leave antennas for both 6 and 2 meters connected. Separate amp keying lines allow connection of separate linear amplifiers for each band.
- 20 watts output power, front panel knob adjustable. Front panel meter does double duty as S-meter on receive and power output meter on transmit.
- Separate low level drive connection from 144 MHz for UHF and microwave transverters.
- All-mode squelch useful for FM repeaters or for quiet monitoring of SSB calling frequencies. Never miss a band opening again!
- Portable operation is a snap. The "6N2" is small and light enough to be carried anywhere. Only 4 1/2 pounds! Current drain is minimal - only 400 mA @ 13.8 VDC on receive.

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TOP SCORES IN VERY ACTIVE ZONES

ZONE 3

W6AX	4,431,712
W7GG	3,469,635
W7AT	2,944,090
N6ED	2,601,228
K6NA	2,457,046
K7RI	2,423,456
K5RR/7	2,113,716
*K8PO/6	1,973,075
KA6SAR	1,896,792
KI6CG	1,319,695

ZONE 4

W9RE	5,287,976
VE3OI	4,916,913
W5KFT	3,838,632
K4AB	3,801,438
K8DX	3,732,344
WB9Z	3,624,410
VE3AT	2,577,498
K9BGL	2,039,151
*NF4A	1,973,760
KVØQ	1,726,041

ZONE 5

KQ2M/1	6,081,879
K4ZW	5,688,640
W4AN	5,622,732
K4XS	5,351,048
N2NT	4,801,572
K3ZO	4,505,614
N2LT	4,166,856
W3BGN	3,867,552
K9NW/8	3,524,125
*K1ZM	3,368,010

ZONE 14

DL2NBU	5,297,160
DL4NAC	4,809,260
DJ4PT	4,724,028
*GW4BLE	4,529,292
EA4KD	3,673,593
SL3A	3,057,525
*CT1DSC	3,023,524
F5RZJ	2,908,800
EA5DFV	2,899,230
G3NAS	2,577,064

ZONE 15

OHØZ	8,506,505
OHØBH	7,447,794
OH2BH	6,156,507
OM8A	5,614,688
S5ØA	5,574,590
LY7Z	4,828,784
LY6M	4,470,060
*SQ6Z	3,599,145
HA8JV	3,289,242
*S53EA	3,314,044

ZONE 25

JH5FXP	4,934,972
JA5OVU	4,907,145
JH4UYB	4,765,128
JA8RWU	3,678,696
JS3CTQ	3,638,071
JAØQNJ	3,484,877
JQ6NAW	1,775,568
JA2BNN	1,560,214
*JH8SLS	1,522,080
*JM1LPN	1,008,763

** Low Power*

tile ground for introducing new contesters to the fun and challenge. That is exactly what G9Q, RK3DZD, AF6P, DN1MA, DN1TUX, EC2AHS, ES1XQ, G6YB, GNØXYZ, NØAX/7, and PI4ZWN did, to name a few.

Multi-Multi

Not satisfied with their massive multi-multi effort in 1999, the crew of CN8WW studied and planned to try to bring the multi-multi record to a higher level. Driving a truck from Germany to Morocco was just one of the tactics they used to beat their own record and set a new multi-multi world record of 78.17M points. Such a massive undertaking can begin to be appreciated by noticing that 18 operators were involved, and they had to construct most of the station from scratch.

Reprising their second place finish of 1999, the IG9A crew set up their field-day-style operation on the top of a high cliff on the northwest coast of Lampedusa island. Third place went to IH9P located on the other island of African Italy, Pantelleria. The #1 score in the western hemisphere and #4 world was turned in by V26B. They finished ahead of VE3EJ.

The battle of the big boys in the U.S. was as fierce as ever. Located in New Hampshire and with a crew of seasoned operators, KC1XX took full advantage of his location to take top honors. Tim's crew at K3LR was not very far behind. Only 5 mults out of 1935 separated these two super stations. In third place was Frank's team at W3LPL. The very fine effort of K9NS resulted in fourth place U.S. All four stations had over 920 multipliers. The difference in the scores was mostly due to QSO totals on certain bands and copying accuracy. For all the multi-multi top scores check out the band-by-band breakdown box.

The number one score in Europe was the field-day effort of the experienced ops at M6T. What can you say about the current European multi-multi record holder except wow! Close on their heels was the outstanding effort of RW2F, followed not far behind by OH2U.

Another noteworthy multi-multi competition took place in Alaska, where KL7Y and KL7RA fought it out for king of zone 1. They created their own competition, with KL7Y edging out KL7RA.

Team Contesting

With five team members in the top ten scores, Neiger's Tigers #1 talked their way to the top of the Team Contesting category! With 57.5 million combined points, they made it clear that they are the ones who are once again king of the hill. The second place award went to Contest Club Finland's Team Sunshine with 43.1 million points. They were triumphant

GMØB, #1 Multi-Single Scotland.

over Neiger's Tigers #2, who finished in third place. In the 2000 contest there were more teams than ever before. Many of the teams were not competing on a world level but against another local or national team. Remember that teams can consist of any five single op contesters. Look at the rules on the CQ WW web page for all the information.

New All-Time Records

World: LA P40P(W5AJ), QA P40W(W2GD), Q28 TR8IG, A21 OD5/OK1MU, A14 Z31GX, MM CN8WW. *USA:* LA K1ZM, L28 N2EE/4, QA KR2Q, A28 N3RR. *North America:* 28 KP2A(KW8N), L28 TI5WFM(JA6WFM), QA KP4KE. *Africa:* LA SU9ZZ, Q28 TR8IG, MM CN8WW. *Asia:* A 9K9X(9K2HN), 21 JY9NX(JM1CAX), L28 TA3D, Q7 UN7FZ, AA A61AJ(DL2CC), A21 OD5/OK1MU. *Japan:* QA JR4DAH, Q21 JA6GCE, MS JH7PKU. *Europe:* LA GW4BLE, Q28 EA2CAR, A14 Z31GX. *Oceania:* A KH7R(CT1BOH), L21 YBØAZ, L14 VK4EMM, L7 FK8GM. *South America:* LA P40P(W5AJ), L28 HC1JQ, QA P40W(W2GD), Q21 LU1FNH, A7 PY5BF.

Special Mention

Every year the contest is made more interesting by hundreds of contesters jumping on planes, into cars, and on trains to head out to more exotic places than their own backyards. The 2000 contest was a ban-

(Continued on page 20)

ZONE LEADERS SINGLE OPERATOR

Zone	Call	Score
1	KL7FAP	59,092
2	VE2GSO	885,750
3	W6AX	4,431,712
4	W9RE	5,287,976
5	KQ2M/1	6,081,879
6	6D2X	7,150,990
7	TI1C	1,583,400
8	8P1A	12,136,203
9	P4ØB	10,450,656
10	HC8A	18,122,040
11	PW7BZ	3,005,100
12	*XQØY	3,189,132
13	LU6EBY	2,066,820
14	DL2NBU	5,297,160
15	OHØZ	8,506,505
16	UV7D	2,703,075
17	UP4L	3,895,304
18	RKØSXF	660,928
19	RAØJJ	688,913
20	C4A	9,351,091
21	9K9X	9,802,784
22	VU2WAP	1,569,542
23	*JT1CO	778,008
24	VR2MY	907,830
25	JH5FXP	4,934,972
26	*HS4BPQ	10,804
27	DU9RG	3,239,659
28	9M8R	7,091,763
29	*AX8HZ	373,932
30	VK5GN	3,494,205
31	KH7R	11,894,730
32	ZL1ANJ	1,398,012
33	EA8AH	13,965,672
34	*SU9ZZ	8,209,349
35	D4A	10,911,021
36	*TR8IG	615,462
37	5X1Z	2,729,610
38	ZS6EZ	2,734,464
39	FR5DX	4,714,632
40	TF3CW	549,807

** Low Power*

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Model DX-A 160-80-40- Meter Quarter Wave Twin Sloper .....$59.95 each
- The premier low frequency DX antenna.
- Combines the tremendous DX firepower of the quarter wave sloper with the wide band width of the half wave dipole.
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(30-17-12 meters with wide-range tuner)
- Can be used as inverted-V.
- Only 40' overall length.

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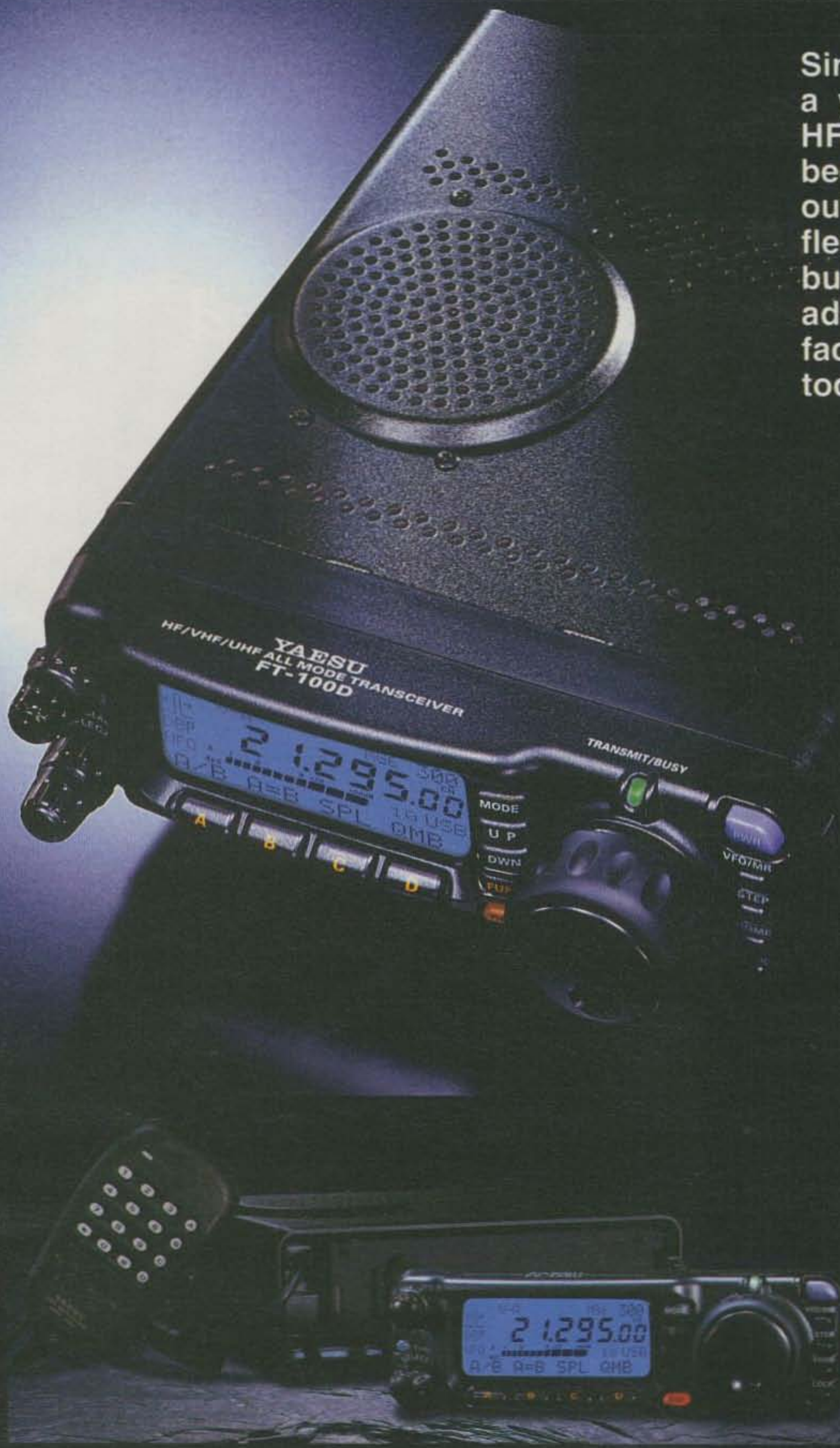
MOBILE DX MASTER



Since its introduction over a year ago, Yaesu's FT-100 HF/VHF/UHF Transceiver has been widely acclaimed for its outstanding performance and flexibility. Now the FT-100D builds on this success story, adding the convenience of factory-installed modules for today's Ham on the go!

FT-100D HIGHLIGHTS

The FT-100D is a high-performance, ultra-compact transceiver operating on the 160-10 meter HF bands, plus the 50, 144, and 430 MHz VHF/UHF bands. Known for its outstanding receiver performance, the FT-100D's easy-to-access DSP system is the cornerstone of the outstanding receiver capability. Providing Noise Reduction, Auto-Notch, and Narrow-Bandwidth Filter selection, the DSP system also includes a Microphone Equalizer for the transmit side.

The new and enlarged speaker of the FT-100D (ϕ66 mm) provides spectacularly clean audio output, to help you dig out those weak signals.

Whether at home or away, the fantastic new FT-100D is The Choice of the World's Top DX'ers. Step up to the FT-100D, and enjoy the thrill of the sunspot peak in style!

MICRO MOBILE

FT-100D

Ultra-Compact HF/VHF/UHF Transceiver

YAESU

Choice of the World's top DX'ers

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Simultaneous Reception

VHF/VHF | UHF/UHF | VHF/UHF

A New Dual-Band Engineering Milestone:
Introducing the Dual Band Mobile for the 21st Century's Active Ham!

The Yaesu Engineering Team has done it again! The exciting new FT-7100M Dual Band Mobile brings you the ruggedness and operating ease of our single-band mobiles, and the convenience of remote-head mounting capability (optional YSK-7100 Separation Kit required), in an all-new 144/430 MHz Dual Band design!

Providing 50 Watts of power output on 2 meters, and 35 Watts on 70 cm, the FT-7100M has power to spare when you're in a fringe area. For repeater access or selective simplex calling, you get built-in encoder-decoder circuits providing 50 CTCSS tones and 104 DCS (Digital Code Squelch) codes. And the FT-7100M's huge 262-channel Memory System lets you store up to six Alpha-Numeric characters, for easy channel identification.

Operation of the FT-7100M is simple and straightforward, with separate Volume and Squelch controls for each band during dual-band reception, and eight single-function front panel keys provide the easy feature access you need during mobile operation. What's more, you also get three user-definable keys on the microphone to use for important control functions.

Rugged, reliable, and versatile, the FT-7100M provides the highest cost-performance available among Dual Band FM Mobiles. See your Yaesu Dealer today for a test drive!

144/430 MHz FM Dual Band Mobile Transceiver

FT-7100M

FEATURES

- Frequency Range: TX 144-148, 430-450 MHz RX 108-137 MHz (AM), 137-180 MHz, 320-480 MHz, 810-999.99 MHz (Cellular blocked)
- VHF/UHF, VHF/VHF, and UHF/UHF Dual Receive operation*
- Channel Steps: 5/10/12.5/15/20/25/50 kHz/step
- Power Output: 50 Watts (144 MHz) 35 Watts (430 MHz)
- Power Amplifier Type: 2SK3478 Power MOS FET
- Efficient Cooling System: Direct-flow heat-sink and thermostatically-controlled fan
- 262 Memory Channels: 120 "regular" memories, 5 pairs of band limit memories, and one "HOME" channel on each band
- Alpha-Numeric Memory Labels: 6 Characters on lower display field, 5 Characters on upper
- Smart Search™ Automatic Memory Loading System
- 50 CTCSS Encode/Decode Tones
- 104 DCS Encode/Decode Codes
- CTCSS and DCS Search
- ARTS™ (Auto-Range Transponder System)
- Automatic Repeater Shift (ARS)
- TMF Microphone (U.S. version): Includes 16-memory Auto-dialer, and Direct Frequency Entry
- Band Scanning, Band-Limit Scanning, and Memory Scanning
- Three Priority Channel Modes: VFO, Memory, and Home Channel Priority
- RF Squelch: Opens at user-defined signal level
- Tx Time-Out Timer (TOT)
- Automatic Power-Off (APO)
- 1200/9600 bps Packet Compatible
- Battery Voltage Meter
- Compact Size: 5.8" x 1.9" x 6.9" WHD
- Large (0.9" x 2.3") Liquid Crystal Display
- Cloning Capability: To other FT-7100M Transceivers
- Optional YSK-7100 Separation Kit
- Optional CT-39A Packet Cable

*Simultaneous reception on two different Frequencies, in-band or Cross-Band. Cross-band Repeater Function not available.

For the latest Yaesu news, visit us on the Internet: http://www.vxstd.com

Specifications subject to change without notice. Some accessories and/or options may be standard in certain areas. Frequency coverage may differ in some countries. Check with your local Yaesu Dealer for specific details.

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BAND-BY-BAND BREAKDOWN—TOP ALL BAND SCORES

Number groups indicate: QSOs/Zones/Countries on each band

WORLD TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
HC8A	89/10/17	490/24/73	844/28/89	1326/31/108	2095/37/131	4276/33/129
EA8AH	114/12/42	476/20/74	619/26/80	1966/30/110	1862/34/106	2777/34/111
8P1A	56/8/17	311/14/45	640/23/84	1680/29/101	1899/31/106	3444/36/127
KH7R	27/7/6	387/23/34	703/30/57	1546/37/101	1325/37/96	3485/36/98
D4A	8/4/7	96/12/37	386/22/77	1248/33/120	1589/37/131	2875/31/122
CT3BX	92/10/36	268/18/62	298/18/74	1166/28/100	1580/30/112	2646/34/116
P4ØB	100/8/17	250/17/39	537/19/63	1037/28/89	1444/34/94	3512/35/111
9K9X	66/9/19	72/16/48	443/27/83	1432/34/126	1412/38/123	1870/35/133
3V8BB	109/7/41	278/14/61	609/22/78	1250/37/125	1126/38/122	1678/36/118
C4A	127/9/43	213/14/56	415/22/80	1938/36/122	662/28/97	2112/34/106

USA TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
KQ2M	15/8/7	101/13/47	171/23/72	978/38/138	1289/35/130	895/33/125
K4ZW	13/7/9	82/11/37	121/20/61	1002/36/131	834/35/116	1270/31/119
W4AN	18/8/10	74/14/44	176/26/70	741/35/117	686/33/111	1534/34/124
K4XS	14/7/11	95/16/57	153/25/74	916/36/106	564/34/106	1567/34/120
W9RE	23/10/17	88/19/51	160/27/75	471/34/120	965/36/125	1193/31/122
N2NT	19/7/10	129/12/49	118/20/59	697/37/125	925/34/114	1040/32/122
K3ZO	16/7/8	71/15/41	200/23/74	653/32/108	693/34/108	1129/29/114
W6AX	4/4/3	82/22/33	298/26/63	524/37/111	914/36/117	1015/36/120
N2LT	16/8/10	111/17/53	150/23/69	510/32/109	640/32/103	1046/34/115
W3BGN	31/11/18	102/15/56	133/20/70	475/32/110	611/32/108	912/30/122

WORLD MULTI-OPERATOR SINGLE TRANSMITTER

P3A	218/9/51	350/17/64	617/26/88	2033/36/143	2429/40/139	2766/39/150
ZW5B	11/1/10	138/21/58	305/33/104	1072/38/153	2641/39/163	3903/39/174
VP5L	44/8/21	329/15/56	728/24/94	2383/35/132	2588/36/130	2579/32/125
IQ4A	58/8/57	143/18/78	684/34/119	1385/39/152	1950/39/147	2070/39/156
VP5DX	17/6/17	164/18/55	448/26/88	2050/35/127	2057/36/128	3070/36/137
RU1A	93/10/50	400/25/84	511/34/111	1544/39/160	2099/39/155	1207/39/163

USA MULTI-OPERATOR SINGLE TRANSMITTER

K1AR	31/12/25	177/22/78	345/34/110	1015/38/160	1411/39/159	1193/40/162
K5MR	20/12/18	83/22/63	241/32/101	653/38/153	1224/39/158	1876/39/166
W2A	14/8/11	224/20/71	167/28/94	947/39/150	1548/39/159	1163/37/152
N2NU	26/11/18	97/16/50	322/30/97	700/37/140	1480/40/144	1359/37/154
K4JA	25/12/23	68/20/65	137/28.89	1157/39/149	953/40/145	1073/39/153
K8AZ	30/13/27	68/18/64	160/32/96	889/39/148	815/37/143	1128/39/154

WORLD MULTI-OPERATOR MULTI-TRANSMITTER

CN8WW	923/17/77	1818/25/106	3545/37/138	6737/40/177	5754/40/175	6934/40/181
IG9A	809/18/78	1810/31/102	1723/36/123	4882/40/173	4303/40/161	4325/40/170
IH9P	810/12/76	1307/19/80	1455/30/97	4263/38/162	3994/39/159	4457/40/166
V26B	438/17/48	933/21/86	1463/27/108	4076/39/147	4649/40/162	4889/39/153
VE3EJ	797/15/34	998/23/90	1657/34/117	2961/39/167	2986/39/166	2670/39/164
J3A	91/9/23	650/18/75	1341/27/102	3190/38/147	3949/40/157	4327/36/136

USA MULTI-OPERATOR MULTI-TRANSMITTER

KC1XX	230/16/39	824/26/99	769/26/99	2052/39/171	2508/40/172	2192/40/164
K3LR	352/15/36	679/24/91	753/34/117	2624/40/184	2159/40/179	1693/39/171
W3LPL	246/18/41	616/25/93	622/36/120	1960/40/170	2216/40/169	1992/39/167
K9NS	185/16/34	331/25/79	469/34/116	1553/39/167	1847/40/167	1933/40/167
N3RS	50/12/22	164/21/77	519/32/107	1127/39/150	1940/40/160	1579/36/163
W4MYA	75/12/25	262/20/72	390/31/99	1363/40/154	1594/39/152	1645/37/153

ner year for such DXpeditions. Here are some interesting ones that probably made it into your log: 4U1VIC, C6AGS, V31GC, FG5BG, P3A, VP2EK, 3V8BB, 8P1A, OHØV, A61AJ, VP5L, AH2R, GD6IA, FP/N8KR, J3A, V26B, J80WW, GZ7V, JW5E, VP5T, IG9A, EY2A, D4A, EA8AH, KP2A, 6D2X, V47KP, 9G5MD, 9K9Z, PZ5JR, P40A, VP5DX, P40W, FR/N7DD, XU7AAP, GJ1Y, LX9SW, PY5M, XQØY, ZF2RV, V47NS, CT3BX, 9K9C, FOØWEG, V8A, 9M8R, YN2EJG, 9M6AAC, DX1S, A52W, OHØZ, T88QC, KH7R, V6T1, ZB2X, IH9P, CN8WW, A52B, J43J, T88WX, HD2M, ZK1NJC, T2DX, HBØ/HB9AON, P40P, HC8A, ZK1NDK, ZF2MC, TI5WFM, ERØND, FOØFRA, KH2/ W7LP, T88TU, PJ7/K7ZUM, HBØ/DK7ZL, ZF2AH, FS/AH8DX, PJ7/N4ZC, CT3/DJ6QT, TI5EBU, YBØAVK, TK/IV3UHL, SV9/OH4FR, XE3/WØAH, WP2Z, and KP2/K1VW. Almost all multi stations were mini-expeditions involving operators traveling within a country, state, or city to a station that they usually have spent time helping to build or maintain.

Special mention must be made of several operations. How often are there two A52's on in the CQ WW Contest? Answer: never before. Thanks to A52W and A52B for surprising many a contester, including this writer.

The operation from Kingman Reef had been going full bore when the CQ WW occurred. After some discussion it was decided to enter the contest. Many comments by entrants made the point that they had called K5K for days before the CQ WW with no luck and got them right away in the contest.

The boys from Scotland decided to head over to the Shetlands for the contest. By doing so they activated a semi-rare European country and added to everyone's multiplier totals.

There were many close competitions which warrant special attention. Check out the close battles in the following: FS, UAØ, VU, JA1, OHØ, LY, PA, and YB, high power all band; W1, W4, W8, W9, VE3, UAØ, JA2, G, OH, PA, and UR, low power all band; W5, 5B4, 4X, and EA, 28 MHz; W6, BY, JA1, UN, ON, UA, DL, HA, LY, SP, EA, LU, PY, and YV, low power 28 MHz; JA7, 21 MHz; W6 and ES, low power 21 MHz; QRP 21 MHz; W, DL, and I, assisted all band; VE, VP5, BY, JA, ON, DL, and OM, multi-single; W and KL7, multi-multi.

Comments

Every year the rules for the CQ WW are reviewed and small changes, if appropriate, are made. This year there is a *major* change. There will be a imposed a power limitation of 1500 watts output. This is more precisely defined in the rules *(see the September issue—ed.)*. The reason for imposing a power limit to the high power category is the ever- increasing number of entrants who are running massive power, such as 4000 watts or much more. This creates an unfair situation. As with all other rules, the entrant's personal honesty is what makes for a fair competition.

Packet

Packet continues to be a problem because of some single operators not claiming its use in the contest. Part of the problem is that in Europe some think that assisted is still a single operator. It is not. An assisted operator receives the help of thousands of ears in finding calls. A non-assisted operator finds everything *alone*. Although the number of violators is

Hugo, XE1CRO, #3 world Low Power, 21 MHz.

EUROPE TOP SINGLE OPERATOR ALL BAND

Station	160	80	40	20	15	10
OHØZ	92/7/42	273/8/53	295/16/70	1815/37/124	1604/37/125	1768/36/122
OHØBH	220/8/47	220/20/71	423/33/101	1379/37/126	1340/39/126	1150/38/132
OH2BH	129/7/39	303/14/50	318/25/77	1363/36/111	1096/33/103	1281/35/121
OM8A	36/5/24	170/8/49	420/23/62	1183/36/127	1351/35/110	971/38/115
S5ØA	79/6/40	149/17/59	516/28/97	798/33/103	1033/35/112	1119/36/113
DL2NBU	95/6/41	201/10/53	439/23/82	725/35/114	1129/37/112	1065/35/112
LY7Z	64/6/30	327/12/56	515/25/96	788/38/120	934/35/123	1030/39/132
DL4NAC	90/6/45	303/16/65	608/20/76	701/33/108	599/32/105	1014/38/126
DJ4PT	124/8/43	210/13/58	523/26/77	796/34/90	872/36/89	800/36/102
LY6M	85/7/33	363/11/52	207/15/56	771/32/97	1323/33/106	1155/34/104

EUROPE MULTI-OPERATOR SINGLE TRANSMITTER

IQ4A	58/8/57	143/18/78	684/34/119	1385/39/152	1950/39/147	2070/39/156
RU1A	93/10/50	400/25/84	511/34/111	1544/39/160	2099/39/155	1207/39/163
ZB2X	52/8/36	243/21/76	559/37/128	1899/37/128	1978/35/130	2864/36/132
9A7A	162/7/47	650/20/82	905/31/107	1286/37/139	1964/37/139	1034/38/150
F6BEE	42/5/42	408/16/71	538/32/103	928/38/141	1271/38/136	1711/39/156
OK5W	47/9/47	650/18/80	1221/34/116	1299/40/151	1055/38/138	901/39/145

EUROPE MULTI-OPERATOR MULTI-TRANSMITTER

M6T	852/12/62	1684/23/95	1874/31/113	3320/39/161	2656/40/160	3252/40/172
RW2F	855/10/60	1168/24/82	2310/36/125	2902/39/153	2969/39/154	2361/39/157
OH2U	602/12/60	723/26/84	1215/35/110	3277/39/170	2874/39/164	2407/40/167
OTØA	713/10/60	1645/19/88	2169/34/120	2888/39/152	2342/38/148	2149/40/154
DFØHQ	705/8/54	1305/20/89	2037/33/117	2885/38/158	2300/39/158	2012/40/160
HG6N	562/9/57	1120/17/71	2016/34/122	2851/38/152	2413/38/141	2455/39/162

small, they usually end up as high profile in the results. The CQ WW Contest Committee has developed the means of extracting information supplied to us by sysops from around the world and applying it to a questionable log. By these means we found several operators in the SSB contest who did not claim the assisted category but used packet. Their calls do not appear in the score listings. It actually is very simple. If you want to use packet or other DX spotting nets, please do so, but claim the assisted, multi-single, or multi-multi category.

E-mail

For the 2001 contest please send your SSB log via e-mail to: <ssb@cqww.com>. By doing so you allow us to provide you with an analysis of your log, and you make the CQ WW database for your contest more accurate.

There continues to be some confusion about the cabrillo format. The cabrillo format is created by your logging software. If your software does not provide cabrillo as a log-submission format, you might need to upgrade to submit a cabrillo log. As just mentioned, cabrillo is only a simple form of log submission to be used by the CQ WW. Because it is a standardized form, it is easy for us to strip out all the important data, such as your score, club, QRM, category, address, and other such pieces of information. To gather this information manually is very time consuming and can create errors. Since cabrillo is standardized, do not attempt to modify it. This just makes more problems for us.

Please review your submission to make sure that you have provided all the needed data, especially operators of multi stations. We encourage you to submit pictures of your operation. You can do that by sending the pictures or any questions to: <questions@cqww.com>.

Thanks

Each year hundreds of hours are put into making the CQ WW Contest the most fun and the best judged. The CQ WW Committee members who contributed to the 2000 results are K3LR, N6ZZ, N3ED, K6NA, W7EJ, N9RV, N5TJ, N5NJ, N2NC, K1DG, JE1CKA, I2UIY, S50A, G3SXW, OH2KI, RA3AUU, DL6RAI, EA3DU, CT1BOH, OK2FD, VE3EJ, VA7RR, ON6TT, PY5EG, and F6BEE. Acting as special advisors were K3ZO, W3ZZ, and N2AA. N6TR contributed significant software updates. N5KO provided the means to allow the CQ WW CC reflector to run efficiently, plus packet software checking. N6ZZ spent many hours beta-testing the call database. The score database and high accuracy of the UBN/NIL lists was due to the work of N6AA and N6TW. N6TW

The antennas of Alan, K6ACZ, Assisted, All Band.

processed each e-mail and disk log, turning them all into what N6AA and K3EST used to create the UBN lists and the final results.

Congratulations to all the winners. CU in the 2001 contests!

73, Bob, K3EST

DX QRM

I guess I made a few more contacts than last time. Will be into CQ WW next year, maybe as EA5...***EC5ACA***. At the age of 76 still enjoying CQ WW...***U5WF***. Enjoyed the contest, even though my area was directly hit by a typhoon during it, leaving only 2-1/2 antennas working...***4F3XX***. Fun as usual; ran my new stack of 10m antennas (2 × 6-el × 3) for the first time and they worked really nice but did not beat the aurora on Sunday of course!...***7S2E***. A few RFI computer-related crashes, but all in all, a good test!...***AH8DX***. Had a great time in the contest. Unfortunately, I couldn't spend as much time as I would have liked. Great to work as many DX countries as I did. Looking forward to another CQ WW contest. Conditions could have been better...***GØMRH***. First and last time Assisted—more countries than last year but plenty more got away...***GØNWY***. Due to other commitments I missed the 28th and found condx on 29th superb so I missed half the fun. Storm on 30th blew the aerials down and flooded the shack ...***G3VAO***. At 78 yr of age still enjoy the challenge of competing...***G3FNM***. My first attempt at computer logging. Had great fun picking up some new countries. Hope the check log is of use...***G4EDR***. I raced the 180 miles back from Scotland to make a few QSOs under my G call!...***G4OBK***. That CQ WW SSB was a training exercise to introduce our new members and operators to the vast functions of TR-Log. This station was closed down at circa 15:55Z on Sunday and will therefore not warrant a full-blown entry. Please find below our check log for Y2K...***G9Q***. Our hilltop location was great for propagation but was exposed to some of the worst winds and rain the British Isles has seen in many years. Fortunately, everything survived. Signals on Sunday were weak, but still readable on most bands. We never heard any W/VE on 160...***GD6IA***. Surprising what can be worked on 10m with 100w & GP in CQ WW!...***GM4OBK***. Band conditions much better this year. Lost my 160/80m antennas in severe gales just before the contest so restricted to four bands. Running just 5 watts it was tough at times but great fun!...***GWØVSW***.

Propagation was so and so. A family team consisting of wife at computer, husband and a good friend at the rig, and son in the kitchen is a new way to meet friends and hams in a contest. WW DX remains my favorite contest... ***I4MFA***. Very nice contest! It was my first time that I try so I'm happy for my test...***IZ1ANZ***. I hope a part of the rule changes. QSO with the same country is a point. Or don't count the same country's multiplier. Because calling the same country stations is a mental burden in point of that might be 0 point for the stations...***JAØQWO***. Good condx. But we have heavy local QRNs which bothered us to run...***JA7YAA***. I tried to break the former record of this category. But it is in a Soapbox delicate position because of very small difference between his score Soapbox and mine. I believe the accuracy of my score...***JJ3ZZE***. Operated at the state park 60 miles away from my apartment house. I gained another fantastic experience there...***JR1NKN***. Big linear failed on Thursday, decided to go with 400w on 10m...***LX1NO***. Arrived from my business trip just Saturday afternoon, so not for serious contesting...***LY2OX***. Managed about 35 hours operation altogether. Great fun despite heavy rain storms here in east UK. First 12 hrs: FT900 (100w) barefoot, Cushcraft A3 & dipoles. Remaining time: FT847 + 400w linear, same antennas...***M4U***. Another wet and stormy contest from southeast Scotland. Great fun and no broken masts this year. Will be back for more fun next year...***MMØBQI***. 80+ mph winds in UK flexed the mast severely, making my trousers (pants) change color at times!!...***MMØBRG***. Antennas came down in Sunday's hurricane. My first CQ WW Contest and I've been licensed HF since July. It was great fun and propagation on higher bands was excellent on Saturday but not so good on Sunday. Antennas: CB vertical for 10 & 15m, folded dipole for rest...***MW5EPA***. Bad condx on Sunday. 80m was almost dead to the US and on 10m only very few US stations came through...***OE2BZL***. Unfortunately, the flu got me so I had no time to put up the big antenna...***OE6Z***.

First day good 2300 QSOS; the second was conquered by the aurora...***OH5BM***. Only 12 hours on time due to PC breakdown. CU next year...***OZ1AA***. A very fine weekend with good condx. Never made so many QSOs on SSB. Rig: ICOM IC-740, 60–70 watts output into a TH3-MK4 3-el tribander at 35 ft.; Carolina Beam 80m at 35 ft., which performed extremely well. Openings on 10m one hour earlier on the Carolina Beam than on my beam...***OZ8AE***. Amazing conditions on 10!!... ***P4ØP***. Solar flux a bit high, but band was terrific. Great show! ...***PA3ELD***.

(Continued on page 98)

His vision brought us the first digitally tuned transceiver, the world's most popular 2 meter handheld, the first all-in-one HF/VHF transceiver, and the most advanced ICOM transceiver to date. Meet "Mr. ICOM," Tokuzo Inoue, JA3FA.

CQ Interviews:

"Mr. ICOM" – Tokuzo Inoue, JA3FA

BY SAM VIGIL,* WA6NGH

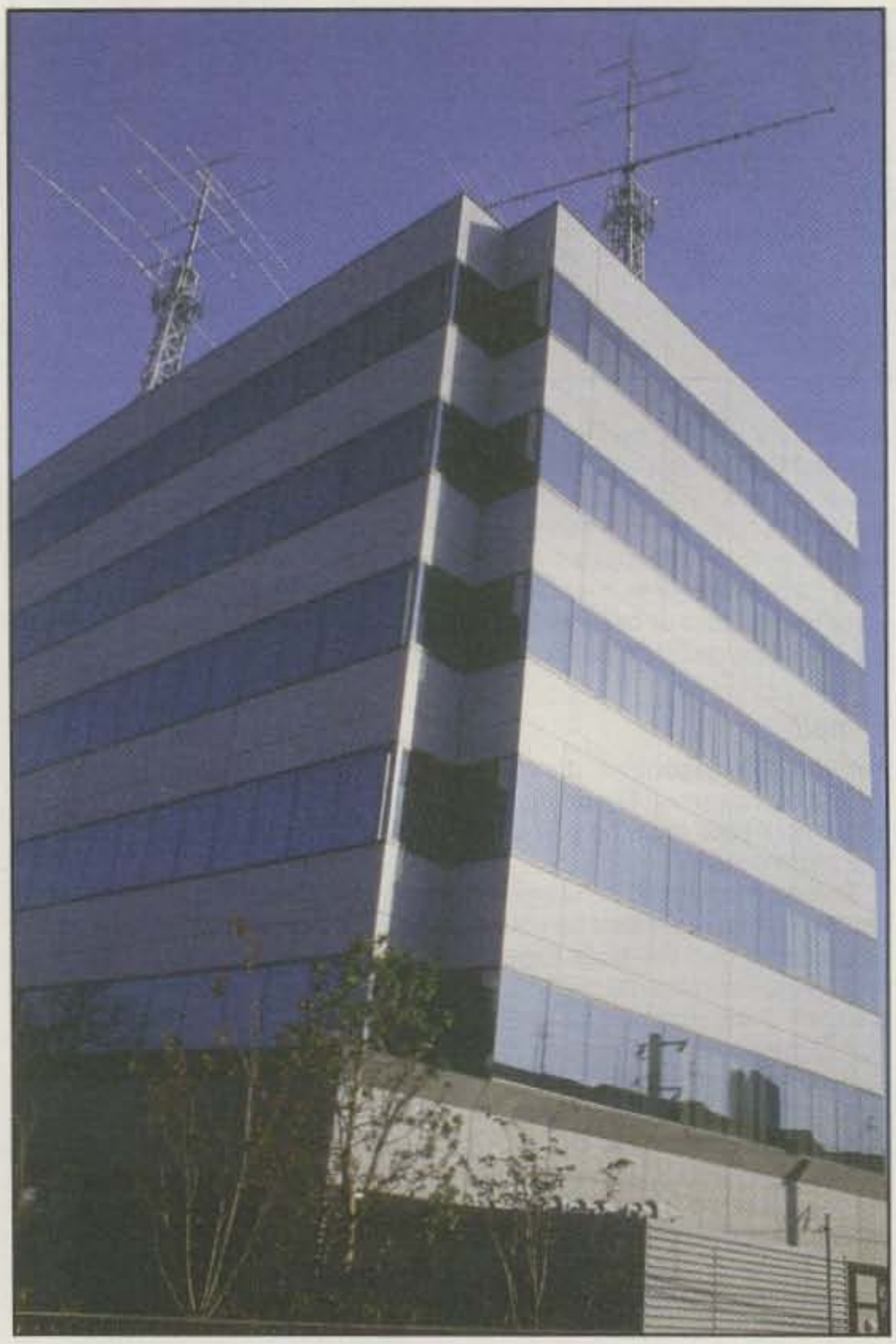
On a recent trip to Japan I was able to arrange an interview with "Mr. ICOM" himself, Tokuzo Inoue, JA3FA, President and Founder of ICOM, Inc . My XYL, Eve, KF6NEV, and I were met at Osaka's modern Shin-Osaka Shinkansen bullet-train rail station by ICOM's Osamu Nakumuta, who guided us through Osaka's elaborate subway and train system, first to our hotel and then on to the ICOM headquarters building. The modern, six-story building is absolutely dwarfed by two massive Yagi arrays, including Japan's first installed Force 12 C49XR tribander.

Meeting Mr. ICOM

Shortly after our arrival, we were ushered into Mr. Inoue's sixth floor office, strategically located just below the two Yagi arrays. He lives and breathes ham radio, down to a JA3FA tie clip and a JA3FA monogram on his shirt sleeve. A fully equipped ham shack is adjacent to his office, complete with an all-ICOM setup (*what else?—ed.*) from an IC-706 MKIIG to the latest IC-756PRO. During an enthusiastic interview Mr. Inoue discussed the history of ICOM, his personal and business philosophies, and his view of the future of ham radio in Japan and the United States. Due to the difficulty of translating Japanese into English without "losing something in the translation," most of what follows is a report of what Mr. Inoue told us, rather than direct quotes. Directly translated answers to some key questions are in the sidebar of excerpts from *CQ*'s interview with JA3FA.

Born in Kyoto Prefecture in 1931, Mr. Inoue became interested in ham radio as a teenager in the 1940s. After ham radio operations were again permitted in Japan in 1952, he became licensed as JA3FA. In 1954, at age 23, he started a medical equipment business, INOUE Seisakusyo. In 1964 he founded INOUE Electric Manufacturing Co., Ltd. It was there that he built and sold his first commercial amateur radio, the all-transistor FDAM-1, a 1 watt, 6 meter mobile transceiver. Over 200 units of this first rig were sold, and followed by 3000 units of an upgraded version. In 1978 the name of the company was changed to ICOM Incorporated (short for Inoue Communications).

Mr. Inoue's business philosophy, from the very start of his company, has always been "Technology first, the money will follow." He was greatly influenced in this by meeting the late Arthur Collins (of Collins Radio), who gave him this advice: "No matter what, keep perfecting your technology. If you perfect your technology and make good products, you will always get business. Forget about unnecessary things and strive to exist by your technology."



The ICOM Building, Osaka, Japan. The antennas on the roof make it easy to find! (Photos by Eve Vigil, KF6NEV)

Although Japan now has over 1.35 million hams (out of a total population of 126 million), the most of any country in the world, this total is down from a previous peak of 2 million. Mr. Inoue attributes much of the loss to the use of cell phones

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T-2X, $619.95. *Extra heavy duty Tailtwister antenna rotator!* For large antennas up to 20 square feet wind load when mounted in-tower, or 10 square feet when mast mounted with optional support bracket. Triple 138 ball bearing race, strong electric locking steel wedge brake. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches. Accepts masts up to 2 1/16 inches diameter. Rotator size is 14 1/16Hx9 3/16D in.

CD-45II, $369.95. *Medium duty antenna rotator.* Handles antenna arrays up to 8.5 square feet windload area when mounted in-tower, or 5 square feet when mast mounted with supplied lower support. Dual 48 ball bearing race, disc brake system. Control Box has an illuminated directional indicator with North or South center of rotation scale, separate snap-action brake and rotation control switches with disc brake release. Accepts mast sizes up to 2 1/8 diameter. Includes light duty lower mast support, Rotator size is 17 3/8Hx8 D inches.

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Rotator Specifications	T2X	HAM-IV	CD-45II	AR-40
Wind Load capacity (inside tower)	20 sq. ft.	15 sq. ft.	8.5 sq. ft.	3.0 sq. ft.
Wind Load (with mast adapter)	10 sq. ft.	7.5 sq. ft.	5.0 sq. ft.	1.5 sq. ft.
Turning Power (in pounds)	1000	800	600	350
Brake Power (in pounds)	9000	5000	800	450
Brake Construction	Electric wedge	Electric wedge	Disc brake	Disc brake
Bearing Assembly/How many	Tripl race/138	Dual Race/96	Dual race/48	Dual race/12
Mounting Hardware	Clamp plate	Clamp plate	Clamp plate	Clamp plate
Control Cable Conductors	8	8	8	5
Shipping Weight (pounds)	28	24	22	14
Effective Moment (in tower)	3400 ft/lbs.	2800 ft/lbs.	1200 ft/lbs.	300 ft/lbs.

ICOM Engineer Yoshitaka Iiboshi, JA3LOQ, and company President Tokuzo Inoue, JA3FA, with ICOM FDAM-1 six meter transceivers. The FDAM-1 was ICOM's first amateur product.

Sam Vigil, WA6NGH, and the ICOM IC-2(A) HT.

ICOM President Tokuzo Inoue, JA3FA, and an ICOM Computer System.

Past and present: The ICOM FDAM-1 and ICOM 910 transceivers together.

and the internet by young people. He believes that the challenge for ham radio will be to convince young people that ham radio offers a unique set of intellectual and scientific challenges not available from commercial forms of communication.

The ICOM Company

ICOM is a diversified business, with Amateur Radio, Land Mobile, Marine Products, and Computer Divisions. ICOM's line of amateur radio equipment is still the company's main business. In fact, the majority of key employees are hams. The Land Mobile Division supplies handheld and mobile rigs to commercial and government users all over the world, including the United States. The Marine Products Division manufactures a diversified range of equipment, including marine radar sets, GPS-equipped mapping systems, and of course, VHF and HF transceivers. ICOM's Computer Division manufactures a full line of desktop and laptop PCs which are sold in Japan through independent dealers and "Soft Island" computer stores. Although presently there are no plans to sell the computers in the U.S., ICOM will be marketing its Wavemaster spread-spectrum wireless LAN systems in the U.S. in the near future.

Mr. Inoue attributes the success of ICOM's diversified product lines to the RF and digital design experience gained from the development of the company's amateur radio products.

ICOM's Past and Ham Radio's Future

After our interview in Mr. Inoue's office we were taken to the ICOM showroom/museum on the first floor. All current ICOM equipment, commercial and amateur, is on display, as well as every ham rig that ICOM has ever produced. In the museum Mr. Inoue pointed out key amateur radio products in the history of ICOM, including the IC-710 transceiver (the first digitally tuned ham rig); the IC-2(A), the world's most popular amateur HT; the IC-706, the first all-in-one multimode HF/VHF rig; and ICOM's latest, the IC-756PRO. He also introduced us to longtime ICOM employee Yoshitaka Iiboshi, JA3LOQ, the engineer who actually assembled the first ICOM radio, the FDAM-1, in 1964.

Eve and I were then invited to join Mr. Inoue and members of his staff in a traditional Japanese dinner at one of his favorite restaurants in Osaka. Over great food, beer, and sake, we discussed his vision for ICOM and for the future of amateur radio. Mr. Inoue sees that his role as a ham radio manufacturer is to "facilitate human-to-human

JA3FA Interview Excerpts

The following are excerpts from *CQ*'s interview with ICOM Founder and President Tokuzo Inoue, JA3FA:

CQ: What was your formal education? How did the courses that you studied contribute to your success in the electronics and radio industry?

JA3FA: I graduated from Yamato-Koriyama High School. I studied electronics and radio technology on my own with my friends to obtain my amateur license. This self- training was the basis of my success in my current radio business.

CQ: Were you surprised by the popularity of your first product, the FDAM-1 six meter transceiver?

JA3FA: Yes, I was surprised by the success of the FDAM-1. The product's good reputation gave us the opportunity to make the final decision to become a radio communication equipment manufacturer.

CQ: Why did you choose that design as your first product?

JA3FA: The FDAM-1 had the newest electronics and mechanical design. We studied the development of it under our concept of good appearance and easy production. Because it was difficult to economically mass produce a plastic or diecast molded case in those days, we went with a simple stamped aluminum case.

CQ: What are your favorite modes of operation? What is your favorite style of operating?

JA3FA: SSB is my favorite mode of operation. Ragchewing and DX are my favorite styles of operating. I enjoy having worldwide communication and making new friends worldwide.

Sam Vigil, WA6NGH, interviews Tokuzo Inoue, JA3FA.

CQ: What is your personal vision for the future of ham radio?

Mr. Inoue: I believe that ham radio will exist forever, as it is one of the best hobbies in the world, and it helps to spread our dreams and our visions. Ham radio is also helpful on the educational side for breeding excellent electronic engineers. . . . (Technically,) I think that both digital and analog will coexist in ham radio.

CQ: What can you tell *CQ* readers about your ultimate transceiver project?

Mr. Inoue: My goal is to produce a radio transceiver with the best specifications ever, and to make it available to hams at a reasonable price. It will combine both analog and digital signal processing.

communications." He still sees ham radio playing a unique role that commercial communications systems such as the internet and cell phones cannot. He feels that it is essential that we continue to attract young people into amateur radio so that they can enjoy and benefit from learning about technology the way that he was able to as a young ham. His current personal project, which he sees as the capstone to his ham radio career, is the development of the ultimate ICOM HF transceiver, which he says will extend RF digital signal processing capabilities to a level never before available to radio amateurs.

More Than Just Technology

During our visit to Japan we were almost overwhelmed with technology, from the lightning-fast Shinkansen bullet trains to the ubiquitous tiny cell phones (about half the size of typical U.S. phones) that everyone in Japan seems to use. Our visit with Mr. Inoue put a human face on Japanese technology. His passion for amateur radio as an enabling technology for communications on a human level is contagious. He truly believes that communications technology can help bring people together.

Acknowledgements

I am indebted to Mr. Tokuzo Inoue, JA3FA, for sharing so much of his time with us on our visit, to Mr. Osamu Nakamuta for acting as our escort and translator when required, and to other members of the ICOM staff, including U.S. National Sales Manager Ray Novak, KC7JPA, for their assistance.

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3CX2500A3	4CX250B & R	4CX10000D	3-500ZG
3CX2500F3	4CX350A & C	4CX15000A	3-1000Z
3CX2500H3	4CX400A	4CX20000A7	4-125A
3CX3000A7	4CX800A	5CX1500A & B	4-250A
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There are two times of the year when amateur radio manufacturers traditionally introduce new equipment—in time for Christmas and in time for Dayton. There's no snow on the ground, so it must have been Dayton! Here's a look at what we found...

Hot Stuff at Hamvention™!

BY RICH MOSESON, W2VU, EDITOR, *CQ*

My first impression was that there wasn't very much new stuff at Dayton this year, but when I sat down to make a list, I came up with over two dozen new items, and some of our columnists found things that I missed. If there were any overall themes this year, they seemed to be on VHF/UHF and limited-space/mobile operating. So with advance apologies to anyone we all missed, here's what I found that was new and hot at the Hamvention.:

Ten-Tec's 6N2 multimode VHF transceiver is one of the few new radios to appear at Dayton in 2001, seemingly more of a year for accessories. The 6N2 operates on 6 and 2 meters and is the first VHF-only multimode rig with digital signal processing.

Things that Generate RF

This category includes transceivers, of course, along with converters, transverters, and amplifiers. (If there were new receivers, we'd put them here, too, since they also generate small amounts of RF in their oscillator circuits.)

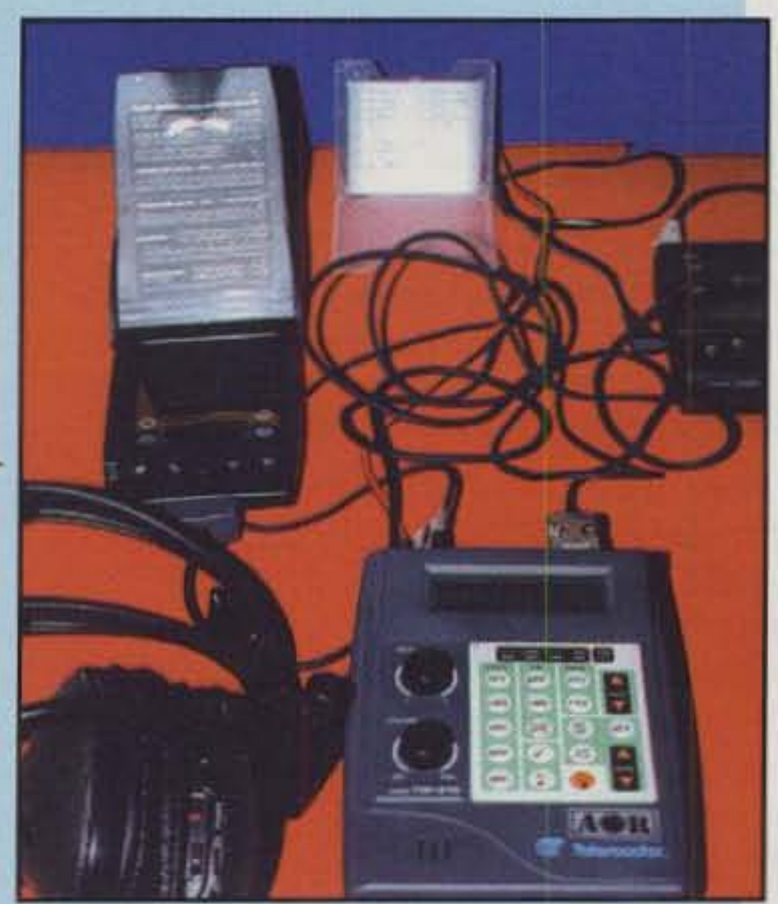
Kenwood's new TH-F6A marks the welcome addition of 222 MHz as a built-in band on a multiband HT. The little radio puts out 5 watts on 144, 222, and 440 MHz, and has receive coverage—on SSB and CW as well as FM and AM—from 100 kHz to 1300 MHz. (Photo courtesy Kenwood Communications)

There were only three new transceivers introduced at Dayton this year (perhaps leading to my initial impression), but they're all significant in their own way. First up is the Ten-Tec 526 "6N2" transceiver, the first-ever VHF-only multimode rig using digital signal processing (DSP) in the IF stage, something now common in HF and HF/VHF/UHF rigs. Uncommon, though, in an under-$700 radio is that it has 28 built-in IF-DSP filters. As its name suggests, the 6N2 covers 6 and 2 meters and operates SSB, CW, and FM with 20 watts out on each band (adjustable down for low-power operation). It has all the memory and scanning features you'd expect in an FM rig, plus a separate low-level drive connection from the 2 meter side for driving UHF and microwave transverters. Oh, and it weighs a massive 4 1/2 pounds!

Kenwood unveiled a new tri-band HT, the TH-F6A, and here's a surprise: The third band is 222 MHz! (The other two are 2 meters and 70 centimeters.) This tiny handheld puts out 5 watts on all three bands and can receive continuously from 100 kHz to 1300 MHz (FM, AM, SSB, and CW). It has 435 memories and comes standard with a rechargeable lithium-ion battery. There was no price announced at its introduction.

TAPR, Tucson Amateur Packet Radio, has brought out its first software defined radio (SDR), which uses software to generate signals on different modes and different frequencies. The folks at TAPR are more interested in

Yaesu's MD-200 microphone adds a "studio mic" look and sound to the company's top-of-the-line FT-1000MP Mark V transceiver. Also introduced this year is a 200 watt, 6 meter transverter for the 1000MP.



The AOR Multimode Terminal (bottom of photo) can copy PSK31 and RTTY without a computer, and produces simulated stereo CW. It's also an outboard DSP filter and mic equalizer. Plug in a PDA equipped with a terminal program, such as the Palm device at the top left, and it will send and receive RTTY and PSK31 via the PDA.

function than form, so the box doesn't look too pretty, but anyone who has one will be on the very cutting edge of radio technology. N8GNJ has more on this radio and other new products in his "Digital Wireless" column. Finally, SGC has updated its popular SG-2020 transceiver. See this month's "QRP" column for details.

The launch of OSCAR-40 and its initial operation only on 435 MHz, 1.2 GHz, and 2.4 GHz has opened the door for SSB/CW equipment operating on those bands. There's plenty of 435 MHz gear out there, thanks to the inclusion of 70 centimeters in most new HF/VHF/ UHF rigs. So if you have an IC-706 MkII-G, IC-910, FT-847, FT-817, FT-100D, or TS-2000 (Did I miss any?), then you can talk *to* the satellite ... but you can't hear its downlink on 2400 MHz. The folks at Down East Microwave (DEM) and Directive Systems—familiar names to many VHF/UHF enthusiasts—have gotten together to offer an OSCAR-40 downlink solution, DEM's 2400-144RX receive converter and Directive Systems' DSH12-17 helix antenna. The antenna is less than two feet long, weighs just five pounds, and is encased completely in a piece of PVC tubing. The 2400 MHz signals it picks up may be fed to the DEM receive converter, which drops them down to 144 MHz before sending them down the coax to your 2 meter multimode receiver. The converter is available assembled, as a kit, or a PC board and parts only (no hardware, connectors or case included). DEM also offers a 23 centimeter transmit converter, which will let you use your 2 meter transmitter to put out a signal on 1269 MHz, where AO-40 also has a working uplink receiver. The receive downconverter, assembled and tested, is $225; the 1.2 GHz transmit converter is $375 ($300 as a kit), and the 2.4 GHz PVC-encased helix is $175.

Also in the "things that generate RF" category is Yaesu's FTV-1000, a 200 watt, 6 meter transverter for the FT-1000 MP Mark V transceiver. One built-in option is Class A audio at reduced power (50 watts). Combining either high power or Class A audio on 6 meters with all of the features of the FT-1000 MP Mark V is certain to be a winner. Price? If you had the money for the FT-1000 MP, it's not a problem. Same for Yaesu's other new entry this year, the MD-200A8X desk microphone. Designed with a "floating studio mic" look, it allows the user to modify its normally flat audio response to highlight higher frequencies for more "punch" in DXing and contesting. It's in the $400 range.

Finally in this category is the high-performance version of the Commander HF-1250 power amplifier. It runs at higher voltage than the original version and has a bigger power transformer, and uses the higher-capacity 3CPX800 tube instead of the original's 3CX500 (a two-tube version is also available). All this allows it to offer no-time-limit key-down operation at 1000 watts CW or 150 watts PEP on SSB. The price is under $2500.

Accessories

Another key area for new products this year is digital communication, especially HF digital communication.

AOR has perhaps the most "different" accessory making its debut this year. The MMT TDF-370 is a "multi media terminal" that does a variety of things. First, it's an outboard DSP audio filter with an auto-notch function to reduce interference from strong signals on adjacent frequencies. It also has several selectable filters for received signals, including one that can simulate "hi-fi" quality on SSB signals and another that simulates stereo reception of CW signals. In addition, the MMT can decode Baudot RTTY and PSK31 signals and display them on its small LCD readout—no computer needed. Add a simple terminal program, such as you'll find on many personal digital assistants (PDAs), and you can both transmit and receive PSK31 and RTTY via the MMT (plus a radio, of course). You can even operate 56.7 kHz slow-scan TV by connecting the unit to a computer with the proper software. On the SSB transmit side, the TDF-370 offers eight channels of mic equalization and will record and store up to 102 seconds of audio in eight "voice keyer" memories. You can even switch between two different inputs.

One of the hottest items at Dayton was the new RIGblaster Plus by West Mountain Radio. The Plus version of this popular PC soundcard-to-radio interface includes true CW and FSK (frequency shift keying) via your radio's key jack, in addition to MCW and AFSK via the mic jack; a headphone jack on the front panel, a footswitch jack, and all the features of the original RIGblaster. Price is $119.95, including mic cable, "wall wart" power cube, and software CD.

MFJ brought out about a half dozen new products at Dayton, including its own soundcard interface, the MFJ-1275, as competition to West Mountain.

The RIGblaster Plus from West Mountain Radio adds true CW and FSK, plus jacks for a headset and footswitch, to the existing capabilities of the original RIGblaster soundcard-to-radio interface.

It includes the same features as the original RIGblaster (minus the software CD), and sells for $89.95, with your choice of 8-pin or modular RJ-45 mic connector. Other new items from MFJ include an audio-powered Morse code reader (yes, it needs a battery, but you hold it near your speaker and it prints out received code signals on its display screen), and four products to feed the growing trend of portable HF operating from remote locations. First is a ground-coupled portable antenna base—a 2-foot-square piece of metal approximating a small car roof, with spikes on the bottom to drive into the ground and two types of antenna mounts on top ($99.95). It's good for temporary installations of vertical antennas, such as at campsites or an emergency command post. Also designed for portable use is MFJ's 33 foot telescoping fiberglass mast. It weighs just over 3 pounds and collapses to less than 4 feet. Fully extended, it's 1/4 wavelength long at 40 meters ($79.95). If your portable rig has a built-in keyer and you need tiny paddles for field use, MFJ's Travel Paddle ($19.95) may be the answer. If your rig doesn't have its own keyer, MFJ has a pocket keyer in a 2" × 4" × 1" case that can solve your problem. The travel paddle is attached to the top, or you can plug in your own paddles if you prefer.

The tiniest paddles we've seen to date were attached directly to an RJ-45 modular plug and plugged into a Yaesu FT-817. Unfortunately, we didn't get a chance to find out any details. The 817 does deserve a mention here. While it was introduced well before this year's Hamvention, Yaesu's portable 5 -watt HF/VHF/UHF rig was a very hot seller there and is responsible for a mini-industry in producing accessories for it, including several of the new MFJ products.

Antennas

There were several new antennas on display at Dayton, and again the emphasis was on limited-space and portable operation.

Cushcraft's ASL 670 is a log periodic antenna offering excellent gain figures and directivity for all frequencies between 50 and 450 MHz. That covers the 6 meter, 2 meter, 1.25 meter (222 MHz) and 70 centimeter (420–450 MHz) bands, all in one 14-element antenna on a boom less than 7 feet long with a turning radius of just over 6 feet (mounted horizontally). It's also good for monitoring aviation and public-service bands.

Fluidmotion, a new company in the amateur field, has introduced a unique 5-band Yagi for 20–10 meters. The elements are made of copper tape on an electric reel, mounted inside a plastic tube. The tape rolls out or in within the tube to match any frequency between 14 and 30 MHz.

The "Rotor Doctor" can help you turn that log periodic, tape Yagi, or any other medium-weight beam, with the new RD-1800 rotator. Stressing simplicity and reliability, the RD-1800 features a standard speed of one RPM, higher torque than similarly priced models made by other manufacturers, and tough gears typically found only on high-end rotators. The RD-1800 sells for $549.

Back to antennas, there were several new no-radial verticals to choose from. Cushcraft has a new MA-5V that covers 20, 17, 15, 12, and 10 meters, weighs only 7 pounds and is only 12 feet high. It's designed for temporary or limited-space installation and can be dismantled quickly. It handles a maximum of 250 watts PEP, but with most of today's HF rigs running about 100 watts "barefoot," that should be no problem. Just keep the kilowatt unplugged when you're using this antenna.

Force-12, best known for its huge HF Yagis, has also entered the limited-space market with two offerings. The center-fed Sigma-5 is a vertical for 20–10 meters. As a vertical dipole, no radials are needed, although Force-12 says a dense ground screen can help enhance low-angle energy. The Sigma-5 handles 1200 watts PEP on SSB and 700 watts on CW. It's priced at $349, with an introductory special of $299 (which may or may not still be in effect when you read this). Force-12 has also introduced the Sigma-40, a free-standing 24-foot-high vertical dipole for 40 meters. It's rated for 90 mph winds and 5 kilowatts of power, and could be a solution for 40 meter enthusiasts with limited real estate.

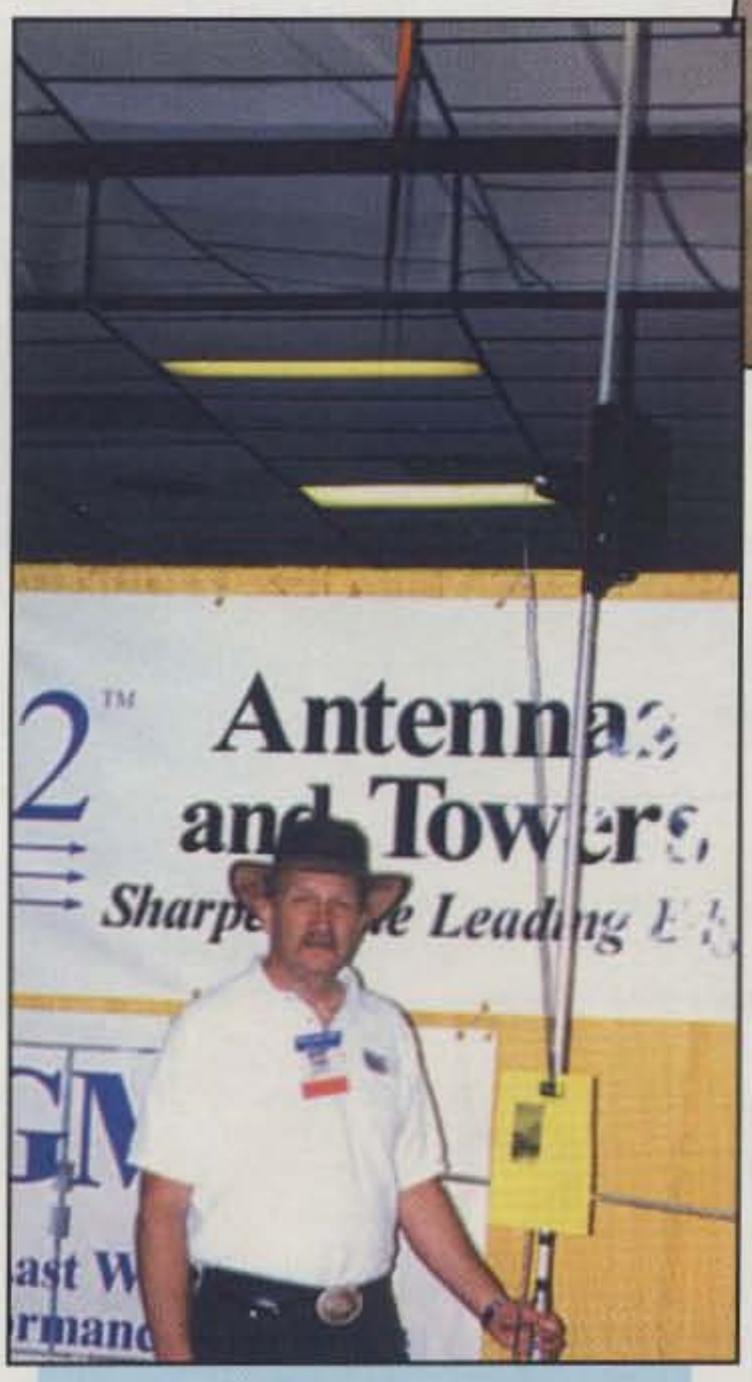
One more portable entry: Creative Services Software, the LogWindows people, has brought out a PVC-encased 2 meter J-pole for indoor or outdoor use. Dubbed the "SafeTenna," it comes with a loop at the top for hanging onto just about anything, and an SO-239 connector at the bottom for attaching to your feedline.

Books and CDs

Finally, we come to books and CDs, and the product that's generating a lot of excitement is the entire collection of *ham radio* magazine on CD-ROM. Produced and marketed jointly by *CQ* and the ARRL, the *ham radio* collection comes in three sets of four CDs each, covering 1968–1976, 1977–1983, and 1984–

One of many new items introduced this year by MFJ, this code reader picks up signals from a speaker and prints out the received code message on its LCD display.

Looking out across Cushcraft's new ASL-670 into the main arena at the Dayton Hamvention, this might be how a pile-up would look if you could see it instead of just hear it! The ASL-670 log periodic is a compact antenna for all frequencies between 50 and 450 MHz.



Force 12's Tom Schiller, N6BT, built his reputation on huge, high-quality, HF Yagis. But here, he's posing with one of the company's newest antennas, the intentionally small Sigma-5 5-band vertical for limited-space operation on 20–10 meters.

1990, respectively. Each 4-CD set is $59.95 and the entire 12-CD collection is $149.95.

CQ has also introduced *The Mobile DXer,* by Dave Mangels, AC6WO ($12.95). Dave does a great job of conveying his enthusiasm for the subject as well as a host of practical hints on selecting, installing, and operating a mobile HF station.

The ARRL brought out five new books for Dayton this year: the annual *ARRL Repeater Directory* ($9); two books by *QST* Editor Steve Ford, WB8IMY—*On the Air With Ham Radio* ($17.95), an introductory volume for new hams, and the *HF Digital Handbook* ($17.95). Also new from the ARRL are *NØAX's Radio Puzzlers* ($7.95) and *Antenna Zoning for the Radio Amateur,* by Fred Hopengarten, K1VR ($49.95 with CD).

Overall, while Dayton 2001 didn't produce much in the way of blockbuster new radios, there is plenty of new stuff to choose from, especially as the market continues to react to the growing popularity of mobile and restricted-space operating, HF digital modes, and the ongoing "mainstreaming" of VHF and UHF into the broader amateur radio hobby. ■

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If you're ready to jump on the DSP bandwagon, the Ten-Tec Jupiter will perform like a champ without chewing up your wallet!

CQ Reviews:

The Ten-Tec Jupiter HF Transceiver

BY RICK LITTLEFIELD,* K1BQT

At times it's easy to believe ham radio sounds the same today as it did back in 1965, right down to the compressed audio, static, QRM, and splatter. But does it? If you've been paying close attention lately, you may have noticed that some SSB signals sound abnormally clear, unrestricted, and "AM-like." In addition, some operators appear less ruffled by loud carriers, local static crashes, and tooth-grinding splatter. Could this phenomenon be the result of some blissful transcending force, or could it simply mean more hams are using DSP radios?

Smarter radios are becoming the norm as manufacturers gain expertise incorporating Digital Signal Processing (DSP) and other current technologies into their products. Although high-tech radios still tend to occupy the upper price echelons, Ten-Tec's Pegasus and Jupiter stand out as notable exceptions. Ten-Tec is no newcomer to advanced communication technology in that it has been supplying sophisticated receivers to commercial and military customers for several years. Now the company's "black-box" expertise is finding its way into the amateur line in the form of bona fide software-driven radios at entry-level prices.

While the Pegasus and Jupiter may appear totally different on the outside, the core circuitry is very similar. In fact, if you wish to try your hand at "virtual radio," you can run the Jupiter remotely with Pegasus software. The main difference between the two is the Jupiter's capacity to stand on its own and perform without a PC connection. Stand-alone independence, of course, comes at a price. Replacing the processing power of your home computer requires the addition of a sophisticated controller board, a variety of panel hardware, a large LCD screen, and several thousand lines of firmware code to make it all work. This evolutionary step adds roughly $300 to the price of the radio. However, the added cost is quite modest when weighed against the processing capacity it provides.

Going Digital

Despite its digital heritage, the Jupiter "looks" conventional. The front panel is divided into functional operating groups (see photos). Frequency controls are clustered on the right. A large 2.5 inch by 4.0 inch LCD display forms the central focus of the panel, with key switches grouped both above and below to initiate various functions. Aside from the two VFO controls (*Tune* and *RIT*), there are only three knobs on the panel—all easy-to-grasp, non-concentric controls stacked in a single vertical row for quick visual identification. The usual front-panel jacks and a rocker-type power switch are grouped on the left.

* 109-A McDaniel Shore Dr., Barrington, NH 03825

Ten-Tec's Jupiter HF transceiver features a simple, uncluttered, front panel that belies the radio's significant array of features. Knobs are not abundant on the Jupiter front panel; there are only five (two for frequency control and three for all other functions). All controls are large and easy to manipulate. (Photo courtesy Ten-Tec)

In reality, the Jupiter operates much like an analog rig, with the major exception that it relies on optical encoding instead of potentiometers to set operating parameters. This difference permits a single multipurpose control, in this case the *Multi* knob, to replace a dozen or so small dedicated knobs. Each function is called up with key switches located below the LCD screen. This "key-and-adjust" control scheme is similar to Ten-Tec's top-of-the-line RX-340 DSP receiver which works great, especially for those of us with poor eyesight and fat fingers who don't like to hunt around for things.

To illustrate exactly how the *Multi* knob works, suppose you wish to reduce RF gain. First press the *RF* key. The words "RF Gain," an analog bar graph, and a numerical percentage (75%) all pop up on the LCD display. As you turn the *Multi* knob, the receiver's RF circuitry and LCD display respond in real time. When you are finished, the radio's processor automatically locks the new setting into memory.

The *Multi* knob controls 11 frequently-adjusted operating parameters, scrolls through the radio's 128 memory channels, and sets attributes for items listed on the main menu. When not assigned to change other values, it's normally set on *AF* to perform as the radio's volume control. The encoders for Pass-Band Tuning (*PBT*) and DSP-filter (*Bandwidth*) are positioned in a line directly above the *Multi* knob to form a cohesive receiver control group.

To access less-frequently adjusted parameters such as VOX settings, press the *Menu* key (see photo). The LCD

screen turns into a full-page listing, the *VFO* knob becomes a scroll control, and the *Multi* knob activates to edit your selection. Unlike some radios that rely on unmarked button-and-knob combinations to alter menu settings, the Jupiter won't send you scrambling for the manual to make a change. Everything is very clear and straightforward!

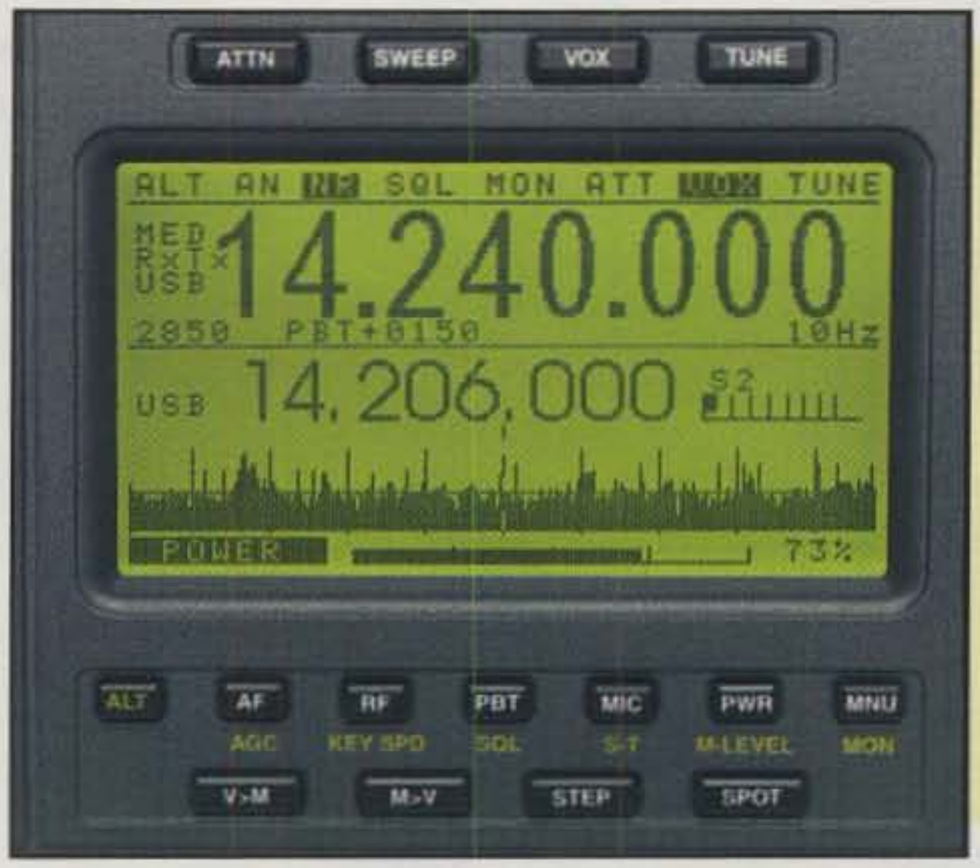
My review radio currently has 25 parameters listed on its menu, but this number is sure to change over time. That's because software-defined radios such as the Jupiter can download new features and modifications any time upgraded firmware code becomes available. For example, my review unit lacked noise blanking and speech processing when it arrived, but after a simple download it acquired both, along with other minor operating system updates. Try that with your KWM-2 or TS-140!

Tuning Around

The Jupiter *Band* selector key toggles sequentially through all nine HF amateur band allocations (a little annoying if you overshoot your band on the first pass and have to go around again). There are dual VFOs, plus the RIT/XIT and "split" functions found on most rigs. *V>M* and *M>V* keys load and recall memory channels, with each channel retaining both frequency and last-used operating-parameter data. Unlike some radios, there's no separate *Write-To* key—you preview channel data with the first key-stroke and load it with a second.

In addition to these conventional VFO functions, the Jupiter offers some special plusses that other rigs in its price class may lack. For example, you won't need your bifocals to read the bold numerals on the frequency display. Even the smaller secondary VFO display is larger than the primary display on my other rig! Also, both VFOs deliver true 1 Hz tuning resolution plus a selection of seven tuning rates. The slowest is a 1-Hz-per-step crawl, which is ideal for zeroing in phase-critical digital signals. The fastest is a 100-kHz-per-step leap, which provides jack-rabbit mobility across the general-coverage spectrum. The VFO's default rate is 10 Hz per step, which offers smooth and precise tuning for SSB or CW signals.

To change VFO rates, press the *Step* key. All seven rate choices appear across the bottom of the screen and you select your preference by pressing the function key located directly underneath. I confess, this procedure threw me for a loop on my first attempt. After pressing *Step,* I found no visual clues linking the menu to the buttons below.



Close-up view of the Jupiter's display screen. The large readout makes it easy to see what frequency you're on in a variety of light conditions. The display also shows the frequency of the sub-VFO and other operating information.

Fortunately, the well-organized manual gave me what I needed to know. My only criticism of the step selection is the jump from 10 Hz (very gradual tuning) to 100 Hz (fast enough to introduce audible stair-stepping). Given my "druthers," I'd love to see an intermediate entry in the 30 Hz step range exchanged for one of the wider and less-often-used steps. This would provide faster "hunt-and-pounce" SSB and CW tuning without the audible roughness characteristic of the 100 Hz increment.

Band Scanning

Many high-priced radios offer live-action spectrum analysis to continuously monitor off-channel activity. The Jupiter has its own version, called Autosweep. Although not continuously updating, this function is still very effective for locating pile-ups, clear spots, and even for nailing naughty neighbors who have overly broad signals. To activate it, press the *Sweep* key. The speaker mutes momentarily as the receiver quickly scans the band to paint a sample-and-hold record of signal amplitudes across the screen (one sweep takes about two seconds). When done, the speaker comes back on and a VFO reference marker appears mid-screen to guide you to any spot of interest on the display. The default span-width is 240 kHz, with seven other options available from 240 Hz to 2.4 MHz. To erase, press the *Sweep* key a second time.

A Designer Radio

The Jupiter comes out of its box ready to plug-n-play with excellent default settings installed at the factory. These presets let you hook up the antenna and operate right away, then explore the radio's more advanced features at your leisure. When the time to fiddle-and-diddle comes, you'll find a wealth of opportunity to reinvent the radio in a million different ways!

Suppose, for example, you enjoy ragchewing with locals on a quiet band. Plug in a good-quality electret or broadcast-dynamic microphone, widen out the transmit passband, back off the ALC, and treat your friends to SSB rivaling the best commercial AM. Weaver modulation and DSP filtering deliver audio transparency unattainable with filter-type rigs (I'm not kidding; this rig has the best on-air audio I've ever heard).

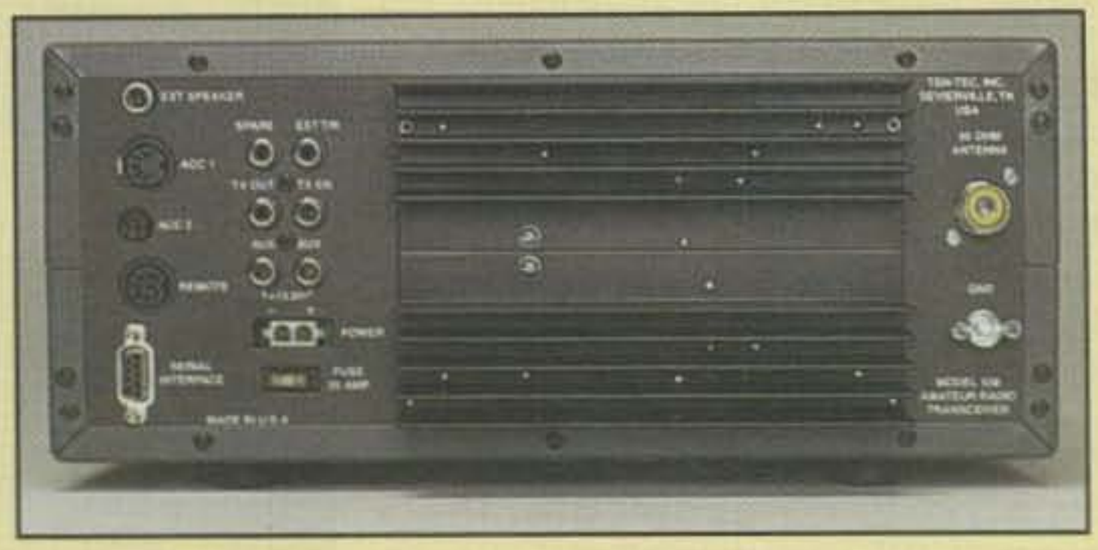
Broadcast audio is great for ragchewing, but not for working serious DX! To reinvent the Jupiter for hazardous duty, narrow the transmit passband to focus power and turn up the processor. Also, arm yourself with the receiver's advanced QRM-fighting tools. You'll find variable passband tuning, 34 IF-filter bandwidths, auto-notch, digital noise reduction, seven-step noise blanking, three AGC rates, a switched front-end attenuator, and adjustable audio equalization to help you pull in signals. These features enable you to dive into pile-ups and grind out points with the best of them! Options such as Vox, speech sidetone, all-mode squelch, and an auxiliary jack for your voice keyer are also available.

On CW I found the Jupiter to be all Ten-Tec—and that means outstanding! Features include seamless QSK (break-in) or adjustable-delay semi-break-in, adjustable CW offset, sidetone with variable pitch and volume, a built-in keyer with adjustable speed and weighting, and adjustable T/R delay to sequence non-QSK amplifiers. There's even a *Spot* tuning aid for audibly matching the pitch of an incoming CW signal to your rig's offset. With no add-ons required, just plug in your favorite paddles and go!

For digital-mode enthusiasts, the Jupiter provides a rear-panel 5-pin DIN I/O jack for your modems or sound card interface—plus a serial port for direct connection to your PC. With variable passband tuning and near-infinite bandwidth selection, you can easily tailor receiver response to your modem's particular tone window. Phase-critical tuning is easy with a 1 Hz per step VFO rate. You can even use the remote VFO encoder/keypad option as a "radio mouse," positioning it next to your PC keyboard.

The Jupiter also transmits and receives on NBFM, which is useful for 10 meter repeater operation or for driving transverters at VHF and above. If you wish to use VHF or UHF converters, the transmitter can be locked out to prevent an accidental burnout.

When it arrived, my version of the radio received—but did not transmit—AM. This limitation was a real crime for a radio that sounds so good on the air. But now, thanks to a newly-released software download, it *can* transmit AM! Once again, software-definition enables the Jupiter's list of features to "grow" long after you've made the purchase. In all modes, power is continuously adjustable from full output to under 10 watts. Mine reduces down to 5 watts, making it "street-legal" for QRP operation.



The Jupiter's rear panel is clean and uncluttered, with most of the space taken up by a heat sink! On the left are connectors of various inputs and outputs, to simplify operation with an external linear amplifier and/or a personal computer.

On the Bench

As far as technical specifications go, the Jupiter is virtually identical to the Pegasus, and the Pegasus has been the subject of many in-depth technical reviews (see July and August 2000 *CQ*). Despite all of this prior scrutiny and accumulated data, I couldn't resist the temptation to throw my review radio on the bench and give it a brief physical for my own edification. First and foremost, I found the specs to be an honest representation of what the radio really does. Output power, various suppression claims, receive noise floor, IP3, IF rejection, AF output, etc., were as advertised or better. Then I set about digging deeper.

When anything new and revolutionary—such as DSP-IF—emerges into the mainstream, a certain amount of nay-saying always seem to come along with it. For example, I've heard on-air grumbling implying some DSP radios suffer from "digital noise" that interferes with weak-signal reception. Curious about this, I listened *very carefully* on a dummy load while watching the scope for anything unusual. While faint DSP artifacts were audible deep in the background when listening on a 50 ohm load, they were well into the noise floor and vanished as soon as a real antenna was connected. I also injected a weak CW tone (–110 dBm) generated by my HP-8640B and analyzed it for traces of unusual distortion or jitter. These symptoms usually indicate digital cross-talk onto oscillator lines. Once again, nothing audible was heard. If some DSP radios have "digital noise" problems that would bother a weak signal, my Jupiter clearly did not.

Incidentally, while checking receiver sensitivity and signal-handling, I was especially taken by the flatness of the AGC circuit. It held the AF level extremely constant over a huge dynamic range. The scope also revealed a nicely shaped CW envelope.

Value vs. Perfection

Poring over the schematics, I concluded that the Jupiter is very well designed for amateur service. However, with a $1189 price tag, it is not going to be inoculated against every possible adverse operating condition you might encounter—at least not to the same extent as a $4500 radio (otherwise it, too, would cost $4500). However, don't let that scare you away, as other radios in this price class aren't inoculated either! In fact, most of the technical differences between the Jupiter and the higher-priced spread are more academic than "real" in scope. For example, to cope with strong signals on an overloaded band, you *could* triple the parts count of your 1st mixer stage to handle more power, or you could switch in a simple front-end attenuator. Either strategy yields roughly the same outcome, but the attenuator's a whole lot cheaper. By the same token, having 57 IF-bandwidths vs. 34 available will probably *never* makes the difference between copying or not copying a station—and either option will be head-and-shoulders above the two or three IF bandwidth choices we're used to having on our filter rigs! Even differences such as using one roofing filter instead of two, or providing a 1 watt audio IC instead of a 5 watt IC to drive a 3 inch speaker, may never degrade performance in any obvious way! Thus, for my money, design decisions such as these are far outweighed by the tremendous flexibility and wide-ranging features that the Jupiter offers.

Put another way, if you're an elite contest devotee and believe you must have a $4500 radio to maintain your competitive edge, call your broker and make the arrangements. However, if you just like to operate and want a nice-performing software-defined DSP radio for about one-quarter the cost, whip out your checkbook and buy a Jupiter!

Conclusion

By now it should be evident that I thoroughly enjoyed operating this radio and think it's a great value. I found the software-driven platform infinitely more interesting to operate than my conventional radio, which is locked into a far more limited range of options. The Jupiter's list of attributes is both long and open-ended, allowing you to tackle SSB, CW, PSK31, SSTV, AMTOR, FM, or whatever you wish with a radio tailored by you to suit your specific needs. And, it is—without question—the best-sounding SSB radio I've ever put on the air! Of course, operating with this new technology is a two-way street. If you think your neighbor's Weaver-modulated DSP radio sounds good on your conventional filter-type rig, wait until you hear it on a DSP-IF receiver. Then you'll *know* it's not 1965 anymore!

Ten-Tec sells factory direct to consumers. For more information or to order the Jupiter ($1189), contact Ten-Tec, 1185 Dolly Parton Pkwy., Sevierville, TN 37862 (phone 800-833-7373; web: <http://www.tentec.com>). ■

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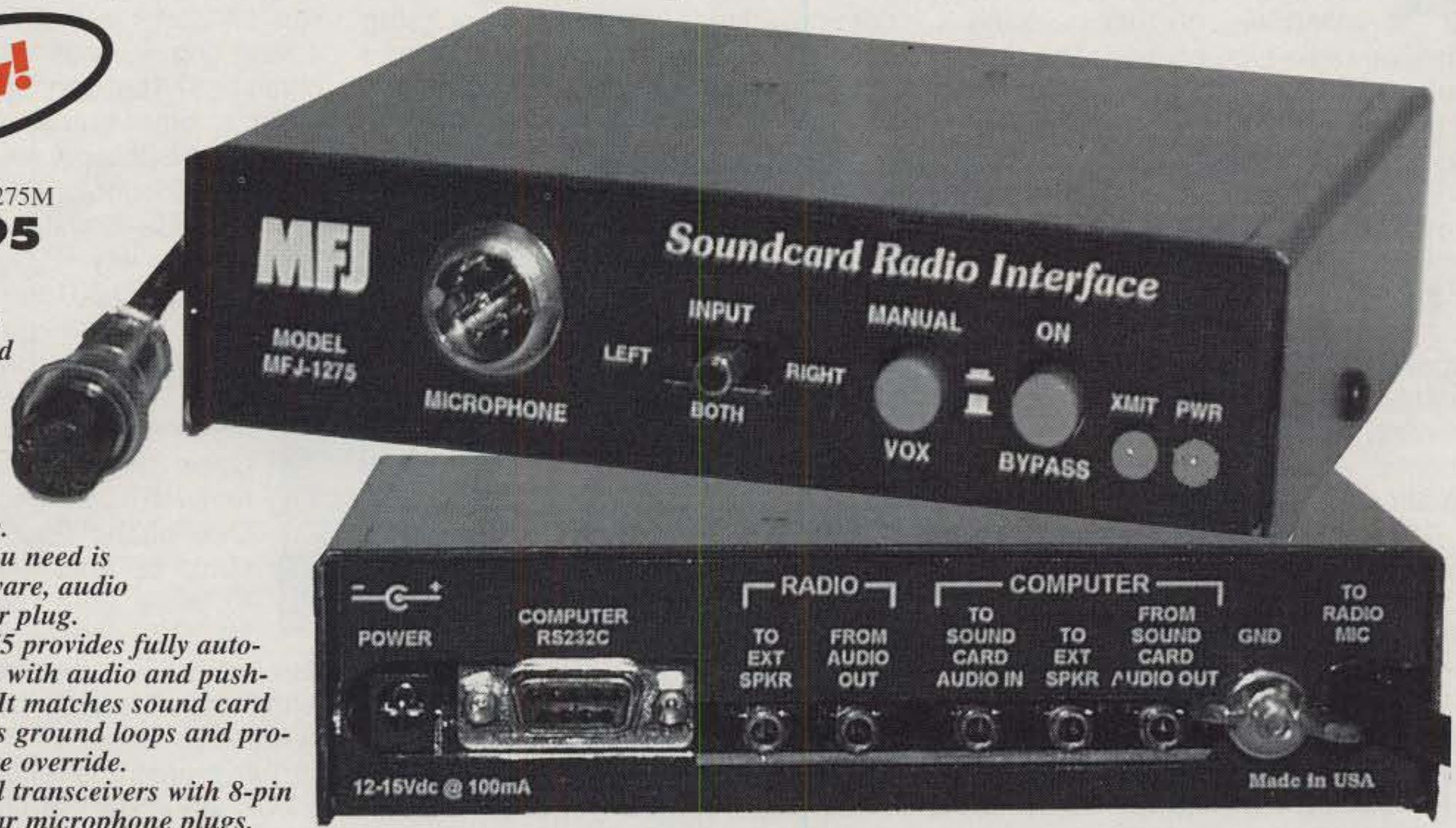

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World Of Ideas

BY DAVE INGRAM, K4TWJ

A Look At The World Around Us

Announcing the Survival Radio Challenge

A few months ago our good friend Wesley Rader, WBØUVN, suggested we consider pursuing a survival-radio-type contest. The more I considered the idea, the more appealing it sounded. Wes suggested an open-to-all-amateurs competition to design and build a simple, compact, reliable, waterproof, and possibly automatic beaconing mini-rig one could use as an aid for rescue and general news updates when lost or stranded. I had been thinking about a similar contest for several months, so the mental wheels began spinning faster.

The idea has now grown into a big-time amateur radio promotion of notable significance, and every amateur is heartily invited (encouraged!) to join the challenge. Further, a fascinating variety of neat awards has been donated by challenge supporters such as *CQ*, MFJ, SGC, and Heil Sound, and await the leading entrants. Here is your golden opportunity to let your creative ideas and efforts be recognized while highlighting amateur radio's special benefits in our modern computer- and internet-oriented world. Go for it! Fame, fun, and goodies await you!

The Challenge

Our survival-radio challenge is divided into two separate categories. One involves designing and building an easy-to-duplicate trans-receiver type units* or setup for impromptu use when desired or as needed. The other category is expanding a commercially-made unit for instant communication in any environment. Units in both categories should be self-contained or a complete package that can be carried and operated anywhere in a stand-alone manner.

Imagine you are suddenly lost or marooned in an unfamiliar area and you need to establish communications with the outside world. Help may be nearby or several hundred miles away; you do not know. Understand, I am not trying to be overly vague in this description. I simply want to leave the scenario open so your creative ideas can flourish.

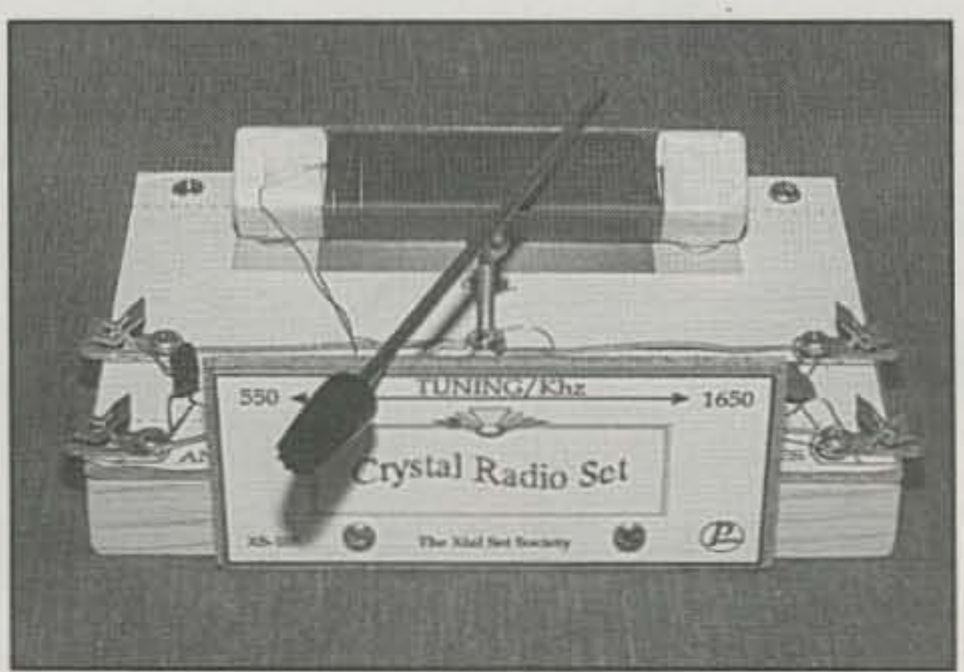

Photo A– This kit crystal set is available from the Crystal Set Society (see text), and it exemplifies the most basic form of survival radio. It is easily assembled, works without batteries, and tunes the AM band or international shortwave bands as determined by the size of its coil. Add a flea-power BFO, and it even works for copying CW signals.

One example of a trans-receiver setup is a shortwave-tuning crystal set with a flea-power BFO for CW reception and a mating one-transistor transmitter powered by watch batteries, tomatoes, or grapefruit juice. Is that a rinky-dink idea? Not if it works well enough to yield life-saving communications. Will it win the challenge? That depends on how it compares to other entries. Where to start? Maybe photo A will kindle your creative thoughts. That neat little crystal set is available from the Crystal Set Society, P.O. Box 3026, St. Louis, MO 63130.

Another "category 1" example is combining a BayGen wind-up AM/FM/shortwave radio such as the one shown in photo B with a quick-assemble half-watt transmitter such as the Michigan Mity Mite. One of the BayGen's IF stages could be adjusted into oscillation to serve as a regenerative BFO for CW reception. Hallicrafters' famous S-38E used that idea, and thousands of amateurs proved it worked well.

Two more trans-receiver examples or ideas are shown in figs. 1 and 2 and photo C. Remember my Micronaut transmitter kit and Steve Bornstein, K8IDN's complementing Micronaut receiver kit featured in *CQ* (August 1997 "World of Ideas") and *QST* a few years ago ? If both units were assembled surface-mount style and powered by tiny ZA-13 zinc-air hearing-aid batteries, they would produce a twin-keyfob HF station. Set them up for 30 meter operation (the ideal QRP and "open day and

Photo B– A hand-cranked or generator-powered shortwave radio such as this BayGen with one of its IF stages adjusted to oscillate like a regenerative BFO can copy CW. Add a 200 milliwatt transmitter, and you have a thought-whetting survival radio system for emergency communications or world monitoring.

4941 Scenic View Drive, Birmingham, AL 35210
e-mail: <k4twj@cq-amateur-radio.com>
**Trans-receiver is an electronically-separate transmitter and receiver in the same case. The two "halves" do not share circuitry, as in a transceiver.*

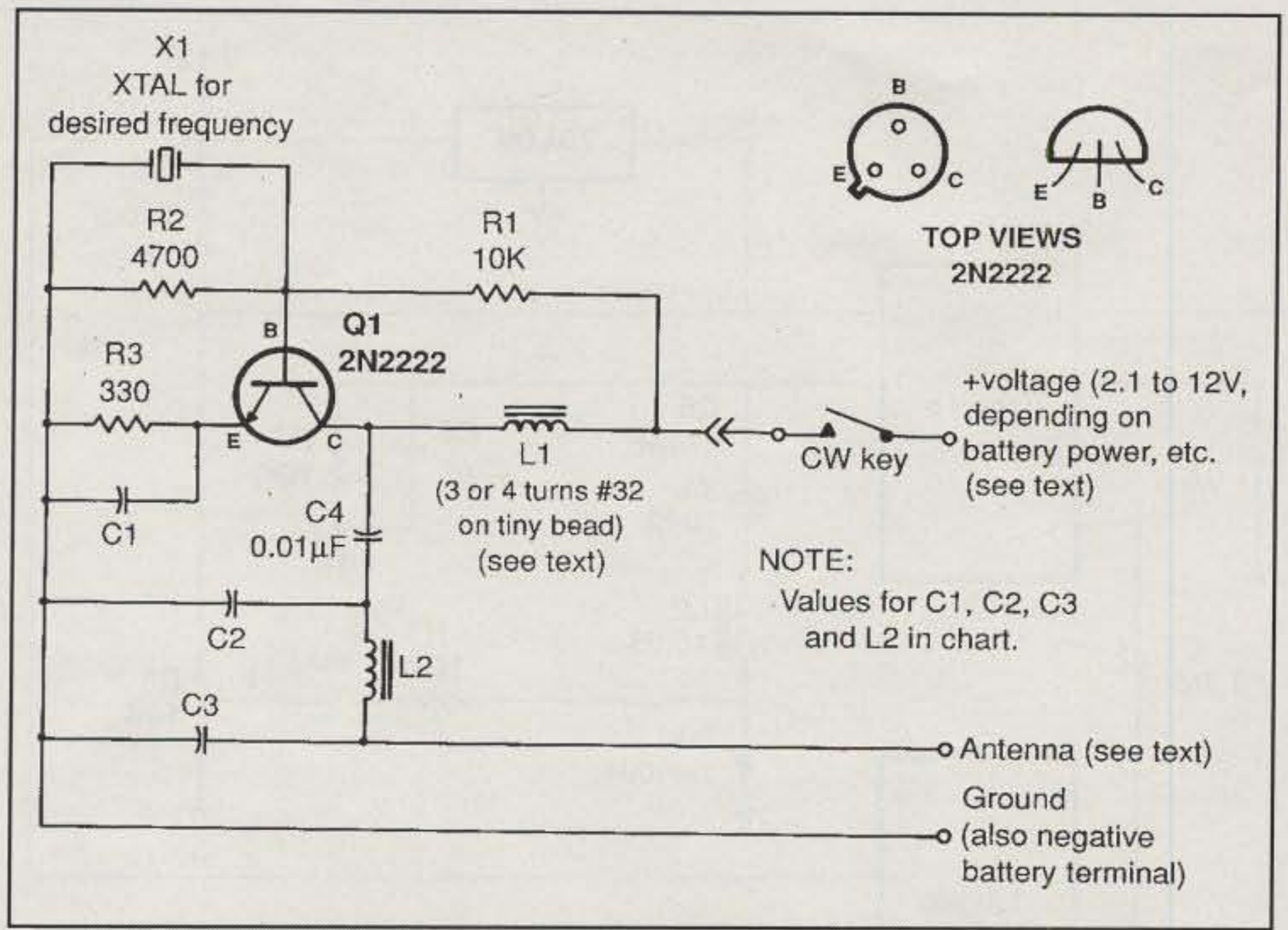

Fig. 1– Micronaut transmitter and receiver kits make simple yet effective HF stations you can hold in your hand. Add battery, key, and antenna, and you have a stand-alone setup capable of long-range communications. The transmitter will even operate from tomato or grapefruit power. Shown here is the circuit diagram of my Micronaut transmitter kit. For 40 meter operation C1, C2, and C3 are 470 pFd, and L2 is 16 turns of #28 copper wire on a T-50-2 toroid. For full details see my self-published book QRP Now! *($19.50 direct from my house to yours via Priority Mail).*

night" band), add a super-thin roll-up antenna plus tiny earbud, and you have a true "go anywhere rig."

As an alternative, Kanga's ever-popular "Oner" 1 inch square, 1 watt transmitter kit (available from N8ET, Kanga US, 3521 Spring Lake Dr., Findlay, OH 45840) could be interconnected with a direct-conversion receiver for featherweight communications. Using a common pi filter circuit, IN914 T/R Switching diodes, and a twin-diode passive mixer with local oscillator/BFO injection from the "Oner" would streamline size. As illustrated in photo C, the complete setup slips easily into a 1.5 by 2.25 inch plastic microcassette case.

These are only a few ideas to help spark your imagination. I am confident you will come up with some even better ideas as you start thinking creatively.

With respect to our second category, one example is a full-duplex-capable 2 meter/70 cm talkie-type setup complete with all "frills" for communicating through a low-orbiting and FM-repeating satellite such as AO-27. The setup should be small and light enough to carry as comfortably as a wallet, include waterproof protection, and mate with a breakdown/pocket-size dual-band antenna. Communicating via amateur satellite from almost any place on Earth is possible if one has a general idea of its orbit, so some form of scheduling or tracking—possibly for a month at a time—should be included.

Another idea involving commercially-made gear is expanding an HF transceiver to become a waterproof and "single box" station. Dropping a little Yaesu FT-817 into a Ziploc® freezer bag does not qualify for serious consideration here, but including a battery pack, small speaker, and pullout antenna in the case of an MFJ Cub or Elecraft K1 holds merit. I am hesitant to say the idea would qualify for a prize, however, as that depends on what other contestants dream up.

A final thought-whetting idea is a 007-briefcase-type station such as the one Richard Swanson, KØRDS, put together for business trips (photo D). This setup consists of an SGC transceiver, 13 volt gel-cell battery, reel-up multiband antenna, and MFJ tuner. The package is a mite large for carrying in a hip pocket, but it holds merit for survival communications. You may be able

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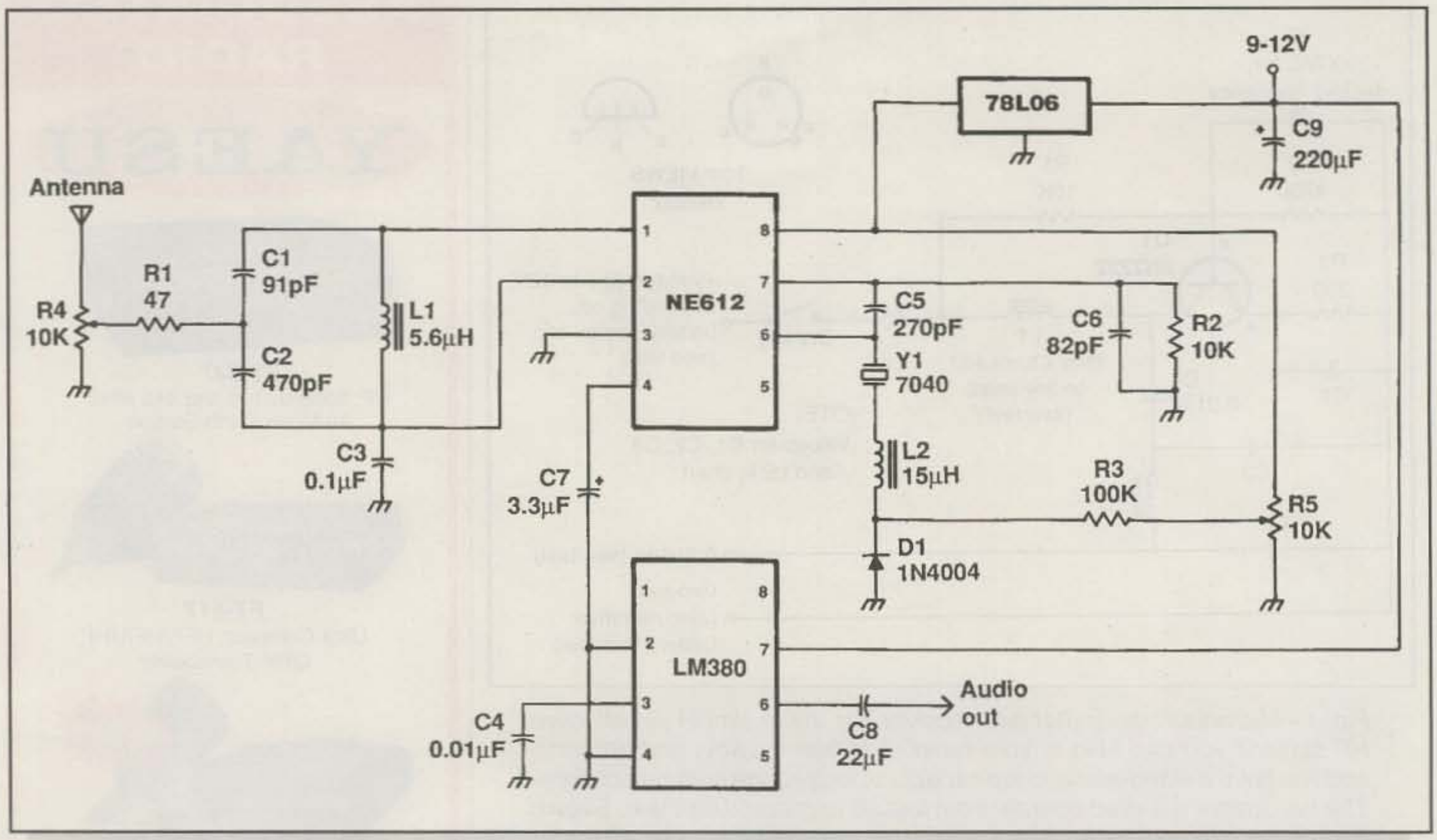

Fig. 2– Circuit diagram of the Micronaut Receiver kit originally produced by Steve Bornstein, K8IDN. PC boards are now available from FAR Circuits <www.cl.ais.net/farcir/>, and all parts (including molded inductor L1) are available from Mouser Electronics <www.mouser.com>. (Full details are in QRP Now.*)*

to out-do all of our previous examples, however, so check out the array of prizes and get cracking!

Prizes and Sponsors

What's in store for high-scoring participants in this unique challenge? Plenty, and the list of goodies may grow larger before the day of the judging. Originally, I planned to award "Ingram Communications Achievement" plaques and *CQ* agreed to award one-year subscriptions/renewals to winners in each of the two categories. Then "Good Guys of Amateur Radio" friends such as Martin Jue, K5FLU, Bob Heil, K9EID, and SGC's Pierre Goral, KI7UA, also supported the idea and donated some very special prizes. MFJ donated two Cub transceiver kits, Heil Sound donated a new HMM hand mic plus a BM-10 headset and two T-shirts, and SGC donated an SG-237 automatic antenna coupler plus some SGC baseball caps (see photo E).

The Cub is a hot little 2 watt CW transceiver that operates from any small 13 volt battery pack, works like a big rig, and goes anywhere. It has a very good crystal filter, a hefty transmitter "final," and VFO control. It's a gem! Heil Sound's new dual-element HMM hand mic features instant switch selection of Bob's popular "DX element" or wide range "baby Goldline" element, and it sounds marvelous! His famous BM-10 consists of lightweight and super-sounding headphones plus a DX or wide-range-element boom mic, and it is terrific for hands-free operation or contesting. Both mics include adapters to fit/plug into the transceiver of your

The Challenge in a Nutshell

Radio amateurs are widely recognized for their ability to communicate using simple homebrewed gear or modified commercially-made equipment, and this survival radio challenge embraces those concepts. It also promotes greater public awareness and appreciation for amateur radio overall—a most important consideration for our continued long-term existence.

The challenge is separated into two categories. One involves designing and building a basic transmitter/receiver-type setup complete with power supply and antenna that can be carried in a pocket and used for on-the-spot hamming or emergency communications. The second category revolves around assembling a complete, go-anywhere communications package using commercially-made or kit gear. Personal creativity and ingenuity in devising a highly diverse setup is encouraged in both categories.

The challenge begins August 1, 2001 and ends December 15, 2001. All entrants must pre-register with Dave Ingram, K4TWJ, 4941 Scenic View Drive, Birmingham, AL 35210 by October 1st and supply a brief overview of their planned project. Early pre-registration is encouraged. If a reply is not requested or desired, a *brief* pre-registration note via e-mail is acceptable. Notes sent via the postal service are preferred, however.

The list of prizes includes two plaques, two subscriptions to *CQ*, two popular MFJ "Cub" transceiver kits, a new super-sounding Heil hand mic, a Heil headset with boom mic, a new SGC-237 automatic antenna coupler, and more.

This is a lighthearted, friendly challenge, and the judges choice of winners is final—no recounts! Winning entrants and runners-up and their ideas will be highlighted in future "World of Ideas" columns.

Join the challenge!

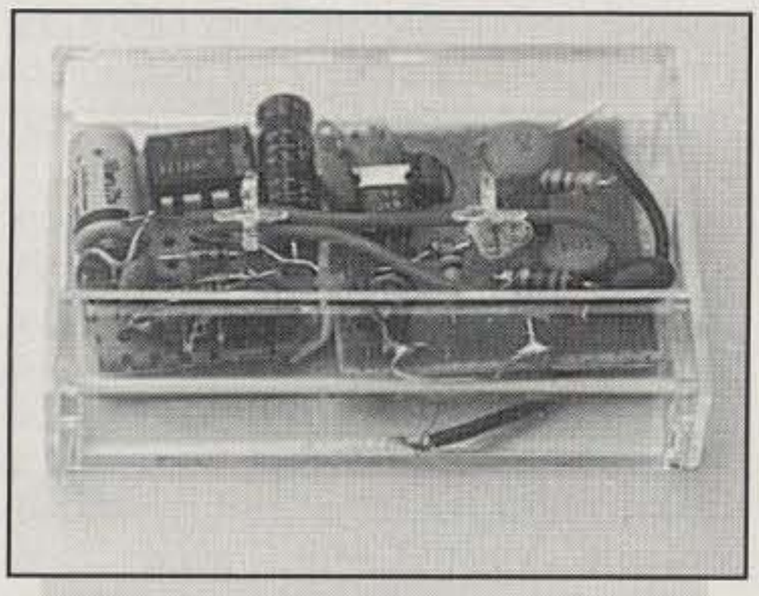

Photo C– Here is a Kanga "Oner" 1-inch-square transmitter mated with a passive mixer and audio amp IC-type direct-conversion receiver nestled in a 1.5 by 2 inch plastic box. The little rig is no larger than a keyfob and it really works!

choice. SGC's new Model 237 automatic antenna coupler/tuner works great for multiband mobiling with a 7 or 9 foot whip. It also tunes longwires, random- length wires, dipoles, and loops for home or portable operation, and since it installs at the antenna's feedpoint, losses are minimized. It's a treat!

Rather than following the old lottery concept of awarding all the prizes to a single person/winner, all prize donors agreed justice would best be served by distributing the prizes among contestants with the most impressive entries. This way everyone (well, almost everyone) wins. Our prize donors also agreed to act as judges, casting numerical votes (1.0 through 5.9) to determine first-, second-, and third-place winners plus runners-up in each category. Judging will be conducted in an informal "friends rewarding friends" manner with decisions final. Congeniality will reign supreme. If you feel uncomfortable with those "live and let live" terms, don't enter!

The challenge begins August 1, 2001 and closes December 15, 2001, with a deadline of pre-registration for entry postmarked by October 1, 2001. Pre-registration is simply a brief note stating your interest and an estimate of when your project will be ready for consideration. Your entry, incidentally, should include photos, circuit diagrams or explanatory sketches, plus a written description sufficiently detailed so others can easily duplicate your project—and experience minimum entanglements getting it working. Also be prepared to demonstrate your brainchild in an actual on-the-air QSO with one of our judges or delegates, if requested. Send your paperwork directly to me (Dave Ingram, K4TWJ, 4941 Scenic View Drive, Birmingham, AL 35210). I will coordinate judging and announce the results here in a future "World of Ideas" column. Noteworthy entries (winners and runners up) will also be highlighted in future columns, ensuring you receive plenty of well-deserved recognition and setting the stage for another challenge in the future. I am considering a new mode for

Photo D– Shrink down this briefcase station assembled by Richard Swanson, KØRDS, to fit in a shirt pocket and you have a good idea of the ultimate survival radio setup.

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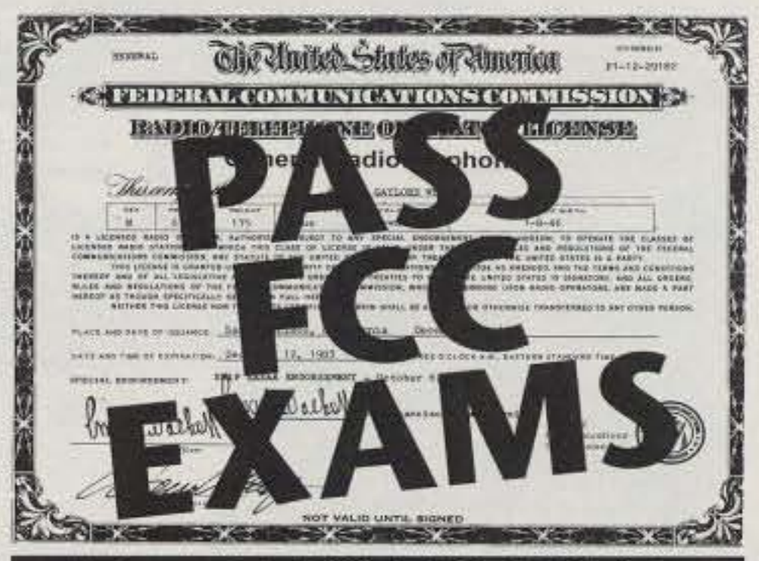

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Photo E– Prizes in the Survival Radio Challenge include some of today's hottest and most popular goodies, such as two MFJ Cub QRP transceivers, a dual-element Heil hand mic, and a high-fidelity Heil headset with boom mic. Also included are an SGC-237 automatic antenna coupler, Heil T-shirts, SGC caps, two subscriptions to CQ, plus two plaques.

voice communications with Universal Language compatibility for that future challenge. What's your opinion?

If possible, I prefer all notes and project descriptions from entrants be sent to me by postal-mail service. Why such an "antiquated" (?) request? Three reasons. The effort of handwriting a note, addressing an envelope (and an SASE if you want a *brief* reply), plus buying and attaching stamps calls for above-average sincerity and diligence. Second, I can (and do!) read mail anywhere and at any time—not just when the computer is on. Third, I receive an astronomical amount of e-mail and continuously stay bogged down with it. (Can anyone help in setting up an auto reply with attachments e-mail system?)

Our Survival Radio Challenge may or may not yield that long overdue boost amateur radio desperately needs, but I am sure it will be a good start in the right direction. Every amateur has at least one good pet project in their mind or on their desk, so share the thoughts, reap the recognition and awards, and may the best ideas win!

73, Dave, K4TWJ

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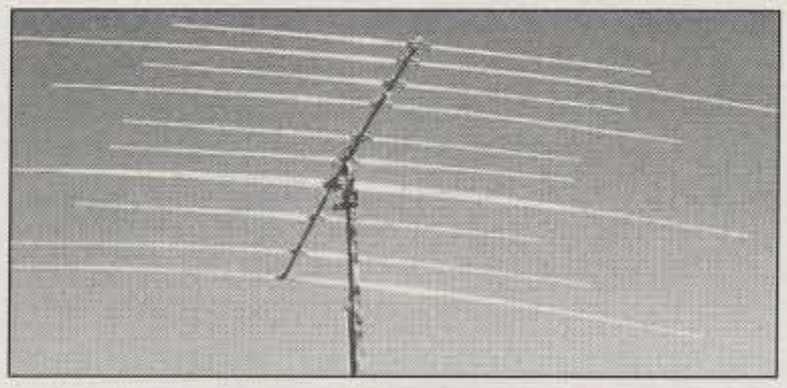

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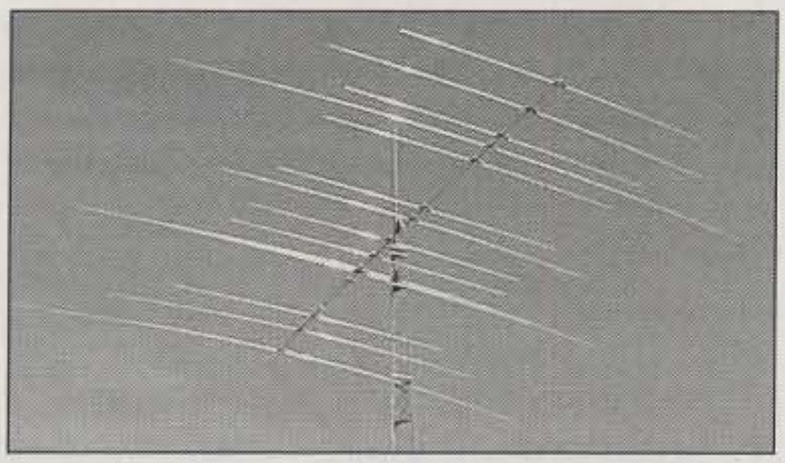

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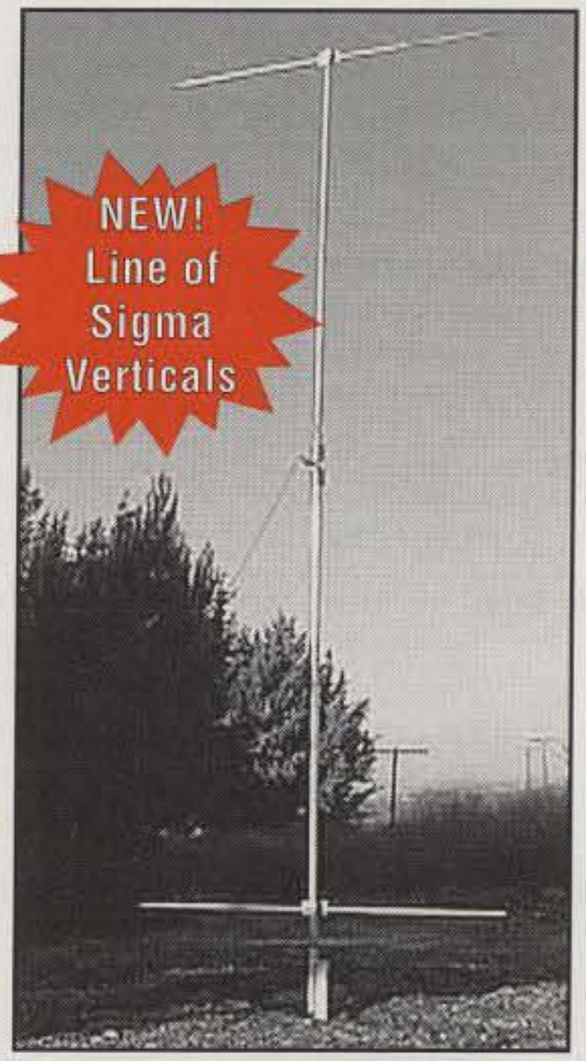

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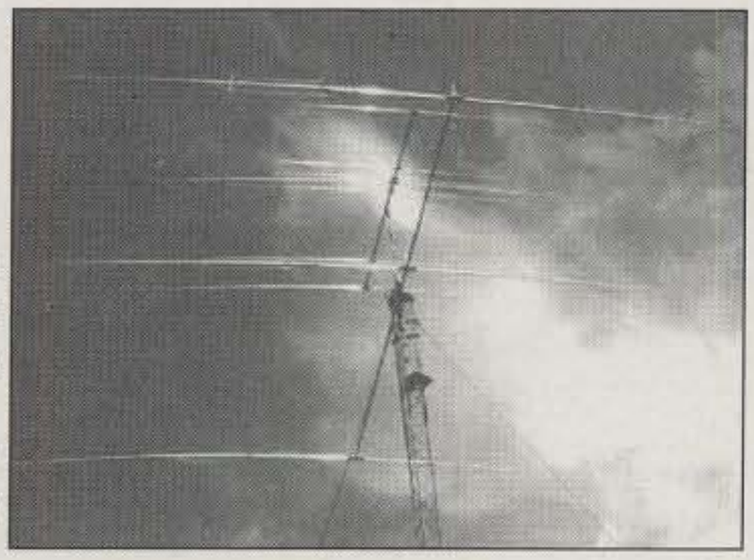

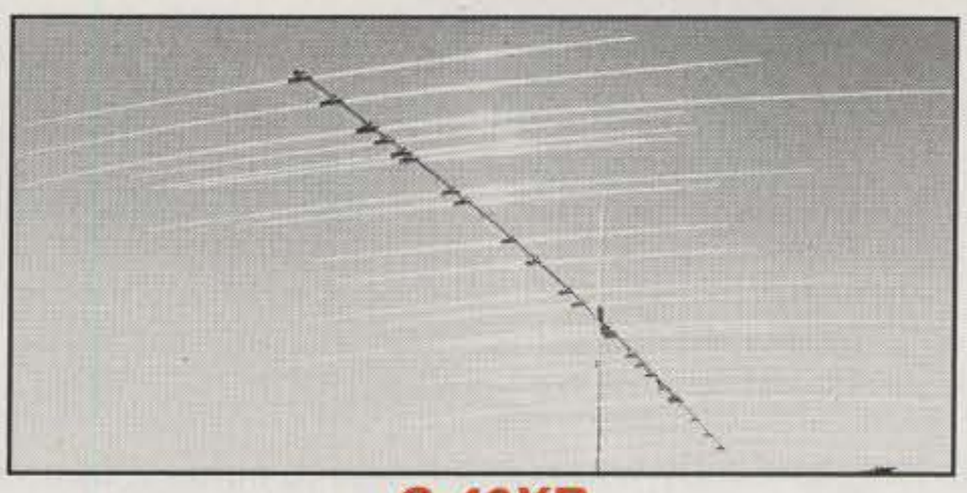

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Reader Survey
August 2001

We'd like to know more about you—about who you are, where you live, what kind(s) of work you do, and of course, what kinds of amateur radio activities you enjoy. Why? To help us serve you better.

Each time we run one of these surveys, we'll ask a few different questions and ask you to indicate your answers by circling numbers on the Reader Service Card and returning it to us (we've already paid the postage). As a bit of an incentive, we'll pick one respondent each month and give that person a complimentary one-year subscription (or subscription extension) to *CQ*.

This month, we'd like to find out more about your ham radio contesting activities.

Please indicate... **Circle Survey Card #**

1. Which one statement most closely matches your level of contest operating activity:

Contesting is my life 26
I am a serious, competitive contester 27
I am an occasional contester 28
I do not operate contests 29

2. Which statement(s) most closely match your feelings about amateur radio contesting:

Fun and competitive 30
Good way to work new stations 31
Good way to build operating and technical skills 32
Good emergency preparedness training 33
I don't enjoy it, but see how other people do 34
A waste of time and spectrum 35

3. Your primary goal in operating contests:

To win my category if possible 36
To beat my previous scores 37
To make contacts needed for operating awards 38
To have fun working lots of other hams 39
I do not operate contests 40

4. Which mode(s) you use in contest operation:

SSB 41
CW 42
RTTY/Digital 43
FM 44
I do not operate contests 45

5. How you log your contest contacts:

Computer—general logging program 46
Computer—special contest logging program 47
Paper 48
Combination 49
Do not log contest contacts 50
Do not operate contests 51

6. How regularly you submit logs to contest sponsors:

Always, whenever I operate in a contest 52
Only if I've done well 53
If I get around to it 54
Rarely 55
Never 56
Do not operate contests 57

7. If you submit contest logs, your usual method of doing so:

By e-mail 58
By postal mail, with disk 59
By postal mail, paper log only 60

Thank you for your responses. We'll have more questions for you in our next reader survey.

What You've Told Us...

Our June survey asked about your VHF/UHF operating habits, and we found the results quite interesting. First, only 6% of the readers who responded operate exclusively on the HF bands. The greatest number (41%) operate HF more than VHF/ UHF, followed by 23% who operate VHF/ UHF more than HF, 18% who split their time about equally above and below 30 MHz, and 12% who operate VHF/UHF exclusively.

Next we asked what kind(s) of VHF/UHF rigs you own. A majority (57%) own both a single-band FM handheld and a single-band FM mobile rig, followed by 52% who own a dual- or multi-band FM handheld and 34% who own a dual- or multi-band FM mobile rig. Next came multimode HF/VHF/ UHF rigs for home use (24%), followed by multimode VHF/UHF-only rigs for home use (23%), multimode HF/VHF/UHF mobile rigs (21%), and multimode VHF/UHF-only mobile radios (18%). Finally, there were 9% who use VHF/UHF transverters with HF rigs and 4% who own no VHF/UHF gear at all.

Your VHF/UHF activity was primarily on repeaters (53%), followed by a steep drop to SSB "weak signal" operation (16%), FM simplex (13%), PacketCluster use (6%), no VHF/UHF activity (6%), CW weak-signal operation (5%), satellite operation (3%), experimenting/building (2%), and packet radio, APRS, and AM operation, which each came in at 1%.

Finally, we asked which band(s) you use regularly. As expected, 2 meters is the overwhelming favorite at 89%, followed by 70 centimeters (61%), 6 meters (43%), 1.25 meters (17%), 23 centimeters (8%), frequencies above 1300 MHz (5%), 33 centimeters (2%) and the European 4 meter band (1%).

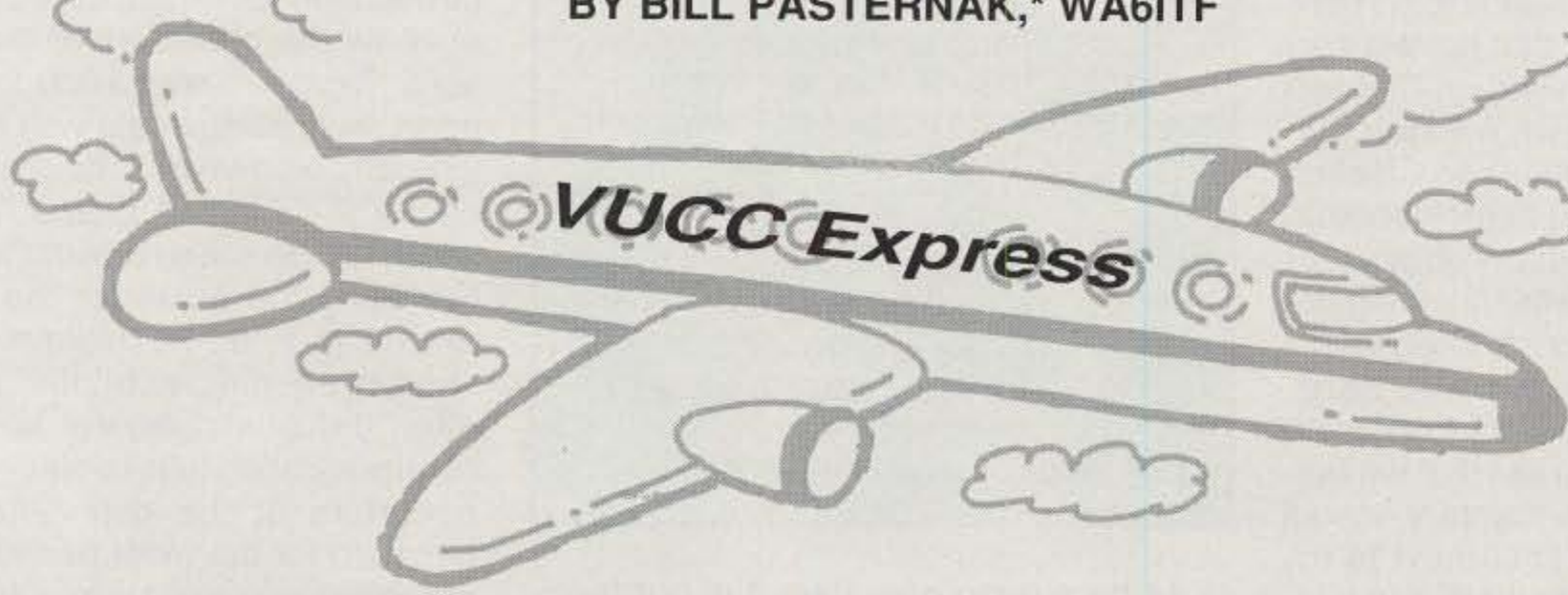
Overall, it appears that most of you count VHF/UHF as an important part of your hamming. The biggest surprises here were the healthy numbers for SSB weak-signal operation, 6 meters and 1.25 meters (222 MHz), plus the near-complete lack of interest in packet radio, except for DX clusters.

This month's winner of a free one-year subscription to *CQ* is Frank Lauri, N2IX, of Carmel, NY. As always, thank you to all who responded to our survey.

If you can't get to an ARRL field checker to review your QSL cards for the VHF/UHF Century Club award, maybe THIS field checker can come to YOU!

Capt. Pete's Fly-In VUCC Certification Service

BY BILL PASTERNAK,* WA6ITF



Peter Heins, N6ZE, has that "one in a million job" that everyone seems to envy. Several times a week, *Captain* Peter Heins gets behind the controls of a Boeing 767 wide-body airliner and takes several hundred people to their vacations, business destinations, reunions with loved ones, etc.

When Pete is not "driving" a giant jet, you will either find him at home in Thousand Oaks, California or in some hotel during a layover between flights. No matter where Peter is, a VHF or UHF radio is always at hand. This is because N6ZE (formerly K1FJM) is among the nation's most active weak-signal DX enthusiasts.

As Pete tells it, his interest in the world above 50 MHz led him to discover the ARRL's VHF-UHF Century Club (VUCC) program. That's the "above 50 MHz" equivalent of the high-frequency DXCC program. After qualifying for the award himself, Pete learned that there was a need for volunteers to field-check QSL cards, so he offered to help. That was way back in 1992, and in almost a decade of checking cards for frequencies between 50 MHz (6 meters) and 474 THz (TeraHertz), he has made over two dozen certifications.

What sets apart N6ZE from others in the VUCC Field Certification Program is where, when, and how Pete performs this volunteer service. Simply described, Capt. Peter Heins, N6ZE, has his own de-facto fly-in certification service. Here is how it works: Airlines permit pilots to "bid" for the destinations to which they want to fly. The more seniority you have, the better your chances are of getting assigned the "first choice" destination that you select. Thus, Pete, and all other pilots, have a good idea a few weeks ahead of time of their work schedules, including the number of hours that they will be laying-over in a given location. This is the secret of Pete's ability to do VUCC certification across the land.

He uses the very popular W6YX VHF/UHF weak-signal internet remailer (see note) to inform the ham radio public of where he will be on given days. A typical message might read (paraphrased): "N6ZE will be available to perform VUCC certification in Miami on the 9th and Boston on the 10th. Contact <k1fjm@aol.com> to set up meeting."

Pete then watches for return e-mail and sets up schedules to meet with those needing his certification services. He also instructs applicants to download the latest VUCC application forms from the ARRL website (http://www.arrl.org) and to complete them before arriving for a certification session. Filling out the forms beforehand saves both Pete and the applicant a lot of time. At the pre-arranged time and place, he and the applicant meet and Pete checks the QSLs.

In a telephone interview N6ZE told me that he decided to start his fly-in VUCC certification service because he could not find anyone to check his own cards. He had to go to New England to have his entry for 6 and 2 meters checked off after a 1500 mile flight. Pete then decided that he would make himself available to perform VUCC certification in those hours when he was "...on the ground but away from home."

I also asked Pete what he considered the most interesting of all the certifications he has performed. He said it was a 474 THz contact made by Jim Sharlow, WB2ODH, off the top of Frasier Peak, California, in grid square DM04. From that 5000 foot hilltop location in the northeast corner of the grid Sharlow managed to work five other grids with what is essentially laser-light communications technology.

Here's the bottom line: If you find yourself in need of VUCC certification and there is nobody in your area to do it, sign up for the W6YX VHF reflector and keep an eye open for postings from Capt. Peter Heins, N6ZE, saying when he will be landing in a city near you.

Note: The W6YX VHF reflector is an internet remailer available to hams interested in all facets of VHF and UHF communications with the exception of FM and repeaters. To subscribe, send an e-mail request to <vhf-request@w6yx.stanford.edu>. To contact the list maintainer, send e-mail to <vhf-approval@w6yx.stanford.edu>. Please do not post questions or comments dealing with FM, repeaters, or other wideband modes.

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VHF Plus

BY JOE LYNCH, N6CL

All About The World Above HF

The Sky is Falling!

This month we hearken back to those voices of our childhood, the ones which told us nursery stories, in particular the story of "Chicken Little" by John Greene Chandler, and how the main character thought that the sky was falling because a pebble from her roof fell and embedded itself in her feathers. (There are versions of the story that have a kernel of corn or an acorn falling on Chicken Little, but for this column we will stick with the pebble version.) We focus on Chicken Little because of an odd coincidence in the placement of books in my library.

Several months ago, after finishing using the book *The Gateway to Storyland,* I put it away in my library. My wife Carol, W6CL, and I had used the story of Chicken Little as the basis for a skit that we performed for a group of elementary school children. I put it on the shelf next to my sole copy of my book *The VHF "How to" Book* mainly because of the similarity in their sizes. I reached for my VHF book the morning of writing this month's column to begin reviewing the topic of meteor scatter. I noticed the coincidental placement of the two books and recalled how as a young person I had thought about the Chicken Little nursery story when I first observed shooting stars.

Not knowing why Chandler wrote his story, I cannot say what was in his mind. However, I can say what was in mine in my youth. It seems that the story made perfect sense to me to explain the phenomenon of falling stars, or meteors. Now as a much older, wiser person, I have discovered that based on my recollection and interpretation of the Chicken Little story, I wasn't far off, particularly as the story relates to the falling pebble. As it turns out, those falling stars, for the most part, are nothing more than falling grains of sand—or very small pebbles. Some falling stars actually make it all the way to the Earth's surface before burning up. These survivors are called meteorites and are the size of pebbles or sometimes pretty-good-size rocks. I dare say that if one of those larger meteorites hit Chicken Little on the head, she would not have lived to tell all of her barnyard friends. Old Foxy Loxy simply would have picked her up and tossed her into the oven without all of the scuffle he endured in the original story.

P.O. Box 73, Oklahoma City, OK 73101
(phone 918-627-6625; fax 918-835-9785)
e-mail: <n6cl@cq-amateur-radio.com>

VHF Plus Calendar

Aug. 1	Lowest Moon declination.
Aug. 4	Full Moon.
Aug. 4-5	ARRL UHF and Above Contest. (See text for details.)
Aug. 5	Poor EME conditions.
Aug. 12	Last quarter Moon. Poor EME conditions. Predicted peak of *Perseids* meteor shower.
Aug. 16	Highest Moon declination.
Aug. 18-19	Moon perigee and new Moon. Except for New Moon, excellent EME conditions. First weekend of ARRL 10 GHz and Above Cumulative Contest. (See text for details.)
Aug. 25	First quarter Moon.
Aug. 26	Very poor EME conditions.
Aug. 31	Moon apogee.

—EME conditions courtesy W5LUU

As ham radio operators it is our fascination with these "pebbles" that causes us to wonder when lots and lots of them will be falling to Earth. Well, once again this month lots of them will be falling. This event is known as the annual *Perseids* meteor shower. Just as the annual ARRL June VHF Contest leads us into summer, so the annual *Perseids* shower highlights another aspect of weak-signal summertime operating.

Those of you who are new to the world of weak-signal communication may be wondering why all of this fascination with falling stars. It is simply because when those stars, or grains of sand, fall into the Earth's atmosphere and burn up (that burning up is the trail of light we see and call a falling star), there is a trail of ionization left in the grain's wake. That trail is in the *E*-layer of the ionosphere.

That *E*-layer is very important to us weak-signal operators because when it is ionized sufficiently, it can provide the basis for reflecting signals back to Earth. The more intense the ionization, the higher the frequency at which a signal can be reflected.

What most of us know about this phenomenon we have learned by our observation of sporadic-*E* propagation. For the past few months (beginning in May) we have been experiencing sporadic-*E* propagation on 6 meters and occasionally 2 meters. Sporadic-*E* propagation occurs when clouds of molecules in the *E*-layer ionize sufficiently to provide a reflection point for signals to be repelled away from them. Due to the signals' particular angle of approach and the height of the *E*-layer above the Earth's surface (between 60–75 miles), often their reflections will be at right angles to their originations. It is this right-angle reflection that causes the signal to propagate forward, away from the originating station, to a distant station, to then be heard by the operator of that distant station. Such sustained propagation enables the operators of these two stations, located about 1000 to 1300 miles apart, to communicate with each other.

Such communications are sporadic because the ionized clouds are forming, breaking apart, and moving while they are providing the basis for the repelling or reflecting of the RF signals. Despite the short-lived nature of the propagation, often there is sufficient time for viable communication to take place between the operators of the two distant stations, because for the most part such sporadic propagation exists for minutes to hours at a time.

This sporadic ionization of the *E*-layer of the ionosphere brings me to the main topic of this month's column—meteor-scatter communication. As I mentioned above, the ionization of the *E*-layer occurs in the wake of the burn up of those grains of sand known as shooting stars or meteors. When this ionization occurs, as with sporadic-*E* propagation, a path of propagation can exist between two radio stations approximately 1000 to 1300 miles from each other.

Here is the uniqueness of meteor-scatter propagation: It is very short-lived. When the grain of sand burns up, ionization occurs. Basic chemistry tells us that ionization is when there is either an excess of or a depletion of electrons in a neutral atomic particle, whether it is an atom or a molecule. Such a static state is not natural. Hence, reformation into the natural state of the atomic particle quickly occurs. Once such reformation is accomplished, the ionization is over and, in the case of the ionosphere, the refractory barrier to RF signals disappears, along with the propagation path between the two distant stations.

The fun part of meteor scatter communication lies in the nature of this short-lived ionization. What we who use meteor-scatter propagation have observed is that the ionization is frequency dependent. We also have observed that it is time dependent. This means that the more intense the ionization, the higher the frequency and the longer the time propagation will occur. For example, a path may

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exist between two stations on 28 MHz for several minutes, on 50 MHz for a half minute or so, on 144 MHz for only a few seconds, on 222 MHz for only a second or so, and on 432 MHz for a fraction of a second. The fun comes in completing a contact with a distant station during those fleeting seconds of the propagation's existence.

The challenge in this propagation game is to find out how to make the odds high enough for communication to occur without it being too easy. As mentioned above, meteor-scatter-caused propagation on lower frequencies can last upwards of a few minutes. This is not much of a challenge. On the other hand, meteor-scatter propagation on 432 MHz, and it rarely occurs, lasts only for a few seconds at the most. For all but the most diligent operators this is too much of a challenge. A compromise frequency that balances out the too easy, too hard ratio of the challenge is 144 MHz. Hence, most of the meteor-scatter communication occurs on this band.

One note concerning 222 MHz: While the propagation exists long enough on 222 to make the challenge fairly easy, because of the lack of activity on that band not much meteor-scatter communications occurs. In a way, this band and its associated propagation are the best kept secret in our hobby. In a future column I will devote some space to covering the pluses of operating on 222 MHz. For now, however, we will concentrate our study of meteor-scatter propagation on 144 MHz.

With meteor-scatter communication, the more grains of sand that fall and burn up in the ionosphere, the more likely propagation will occur. Such is the case during meteor showers, when thousands of grains of sand are falling at the same time. It is during these times that we hams take advantage of the increased odds of our completing contacts by being on the air during the predicted peaks.

There are meteor showers throughout the year. The uniqueness of each, such as how intense the shower will be during a particular year or during a particular set of years, is predictable.

For the most part, meteor showers occur as a result of dust discharges from comets and the Earth traveling through clouds of such discharges. As a comet travels in its orbit around the Sun, the Sun's gravitational pull exerts an influence on the comet, often dislodging large quantities of dust. These quantities of dust travel approximately in orbit with the comet. Because these orbits are plotted, we know when the Earth will pass through the path of the comet's orbit. Also, because we know about when the Sun exerts it gravitational influence on the comet, we generally know where the clumps of dust exist along the orbital path of the comet. Hence, we can predict fairly reliably when the Earth will run into one of these clumps of dust and a meteor shower will occur.

One such highly predictable meteor shower is the *Perseids*. While not necessarily the most intense shower, it is the most popular here in the northern hemisphere because it takes little effort for one to lie out in the backyard on a warm summer night and observe the falling stars, or schedule a few days off to observe the event. In most parts of the northern hemisphere this outdoor activity is not very popular in early January when the *Quads* meteor shower takes place. This is not to say, however, that meteor-scatter communications do not take place at other times of the year. There are plenty of us "ping jockeys" who will work as many of the meteor showers as possible in order to utilized the uniqueness of each of their forms of propagation.

In addition, because of the increased frequency of cosmic dust falling to Earth at a right angle during certain times of the year (the months of July through December) and certain times of the day (past midnight to early morning when the Earth is rotating into the dust falling onto it), meteor-scatter communications can take place quite often. The fact is, meteor-scatter communication can take place every day of the week on lower frequencies. For example, when I lived in Oklahoma City (EM15), often I would point my beam toward the NØLL 6 meter beacon and leave my receiver on its frequency. Every day I would hear the beacon for short periods of time during sporadic meteor-scatter propagation. Therefore, if you get serious about meteor-scatter propagation, there are plenty of opportunities to make many contacts via this propagation mode.

Because of meteor-scatter propagation's unique short duration, there are some operating rules. These rules differ depending upon whether you are attempting to make contact via voice communication or via high-speed CW meteor-scatter communication, or HSMS (high-speed meteor scatter). The latter topic has been covered here and elsewhere in recent months, so this month I will concentrate on voice communications.

For voice communications, here is the generally accepted protocol: For random communications, one operator will call a very brief CQ and listen for a response. An operator hearing the first station will call that station and give his callsign and either his grid locator or a signal report. The first operator then announces the calling station's callsign and gives the response of grid locator or signal report. The second operator then says "Roger" several times. The contact is considered complete if both parties have all they need for the QSO. The entire contact may take as little as 10 seconds to complete, if that.

For most meteor-scatter contacts, how-

ever, a schedule is set up between two operators who wish to talk to each other. If you set such a sked, you'll probably run for half an hour. You'll transmit for 15 seconds and listen for 15 seconds. The westward station transmits first. Some operators break at the end of 7 seconds and listen briefly for the other station. Be sure to clarify operating procedures with the other station before beginning your sked. The initial exchange includes the other station's callsign and your callsign, without either of you saying, "this is." For example, if I, in Oklahoma, grid locator EM26, were running with Jack, AB4CR, in Nashville, Tennessee, grid locator EM66, I'd start by saying, "AB4CR N6CL" over and over again for 15 seconds. I would then listen for Jack to repeat "N6CL AB4CR" over and over again during his 15 seconds of transmission time. After one of us has heard "complete callsigns," the receiving station starts transmitting a signal report. Therefore, when I've heard both my call and Jack's call (in no particular order), I start repeating "S-2" during my 15 second segment, interspersing our callsigns—just in case Jack has yet to hear complete callsigns.

The signal report of "S-2," rather than the traditional "59," is a way of telling the listener the length of the burns being heard. The letter "S" stands for the word "signal" and the number 1, 2, or 3 stands for the length of the burn. Number 1 stands for "pings"; number 2 stands for burns long enough to make a contact; and number 3 stands for very long burns—at least 15 to 30 seconds in length. Therefore, a signal report of "S-2" means that the sending station is hearing the receiving station on burns long enough to make a contact. As a matter of convenience, most operators stick with "S-2"—much like HF operators stick with "59."

Assuming Jack has heard both calls and the signal report "S-2," he'll start saying "Roger, S-2," over and over again during his 15 seconds. Once I have heard "Roger, S-2," I reply with "Roger" over and over again. Once Jack has heard my "Rogers," the QSO is considered complete. As an option, Jack can come back and say "Roger, 73" repeatedly during his sequence. However, that's not necessary to complete the contact.

Occasionally the sequence may be broken. For example, when I ran with Ted Goldthorpe, WA4VCC (now W4VHF), during the 1992 *Perseids,* I heard him give callsigns during the last 3 to 4 seconds of his 15 second segment. I immediately said, "WA4VCC N6CL. WA4VCC N6CL. S-2, S-2, break." Hearing me, Ted came back and said, "Roger, S-2. Roger, S-2, break." Continuing to hear him, I replied, "Roger, roger, roger, break." Hearing my "Rogers," Ted responded, "Roger, 73. Roger, 73. Break." I then replied "73, 73."

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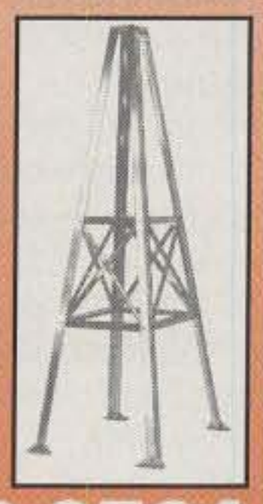

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At that point we both considered the contact more than complete, just three minutes into the half-hour schedule.

Meteor Shower Dates

While this month's shower, the *Perseids,* is the most popular, others occur almost every month. Meteor showers are given names associated with their position in the sky. A shower appears to originate at a particular point in the sky and spreads out from there. The name assigned to each shower is usually related to the constellation closest to the shower's hypothetical point of origin. For example, the *Quadrantids,* or *Quads* for short, the first shower of the year, is named after Quadrans Muralis, now an extinct constellation.

Following is a list of popular and not so popular meteor showers.

January: The *Quadrantids,* a brief (14 hour long, but prolific meteor shower, appears the first week in January. The best paths are north-south. Long-duration meteors can be expected about one-plus hours after the predicted peak. Look for north-south propagation from these meteors, but don't be surprised by propagation from any path.

April: The shower for this month is the *Lyrids.* The best paths are north-south. Although it's a minor shower, on April 21, 1982 at 0650 UTC American astronomers observed a peak that averaged three to five meteoroids per minute. The spike was over in an hour, though.

May: The *Eta Aquarids* is a three-day (between May 4th and 6th) shower. This shower is more popular in the southern latitudes because of the low (–1°) elevation of the radiant. Nevertheless, stations in the southern portion of the United States and stations in Central America can benefit from propagation induced by this shower. While not a productive shower, it did produce in excess of 110 meteoroids per hour in 1980. The best paths for propagation are northeast to southwest and southeast to northwest. East to west propagation is fair and north to south propagation is poor.

Additional potential for meteor-scatter contacts may exist at the end of the month as the first signs of the *Arietids* begin to make their appearance. The minor showers of *Herculids* (May 19 to June 14, peak June 3 to 4) may also have some influence on elevating the number of meteors. The *Scorpiids* (May 29 to June 20, peak June 5 to 6) is a southern-latitude shower. Stations in the southern hemisphere may benefit from the slightly (10 meteoroids per hour) elevated number of meteors entering the atmosphere.

June: Between May 29 and June 19, the *Arietids* meteor shower makes its annual appearance. Don't look for the meteoroids, however; this is principally a daytime shower. The north-to-south path seems to be the best for this shower, with the peak day being June 7–8.

August: The most popular shower of them all, the *Perseids,* peaks around August 11–12. As mentioned, this shower is popular because it occurs in the summer. Also, it's a long-lasting shower. Meteoroids from the *Perseids* start appearing as early as July 15h. However, after August 13 the shower is all but over.

This year the *Perseids* is predicted to peak at around 1110 UTC on August 12. For skeds, be sure to check 3818 and 3843 kHz and the VHF reflector on the internet.

September: On September 1 the *a Aurigids* meteor shower may peak. This is a minor shower that showed some life in 1986 (a 1 hour shower was observed in Hungary). Its radiant position is around 42 degrees, in the constellation *a Aurigae.*

October: The *Draconids* shower has a checkered past. In 1985 it produced 200 meteoroids per hour at its peak. However, since then there has been insufficient activity to support much meteor- scatter communications. Nevertheless, operators reported a marked increase in activity during the 1993 shower, particularly between 1230 and 1400 UTC on October 10. Normal peak days are around October 9 and 10.

The peak of the *Orionids* shower comes around October 22–23. It's considered a minor shower, producing only eight meteors per hour at its maximum. While visibly entertaining, it's not much use for meteor-scatter communications.

While neither of the October showers shows much promise, it's not out of the question that something will happen in space during the months leading up to their scheduled appearances. Effects of the Sun's gravitational pull on comets have created unexpected showers and storms. As always, being prepared is the best bet for success in any VHF+ communications.

November: The showers for this month include the *Taurids* and the *Leonids.* The peak day for the *Taurids* is November 4 or 5h. The peak day for the *Leonids* is November 17 or 18. Neither of these are usually strong showers. However, the *Leonids* has been known to produce storms, and for some parts of the world it did so in 1998 and 1999. Some predictors indicate that we may see another good shower this year.

December: There are two showers scheduled for this month. The first, the *Geminids,* tends to peak on December 13. It's a good north-south shower, producing an average of 50 to 60 meteoroids per hour at its peak.

The second, the *Ursids,* usually peaks around December 22. It's an east-west shower, producing an average of only ten meteoroids per hour at its peak.

For the most comprehensive site on the internet go to <www.imo.net>, the site of the International Meteor Organization. Another interesting site is the home page of Paul Kelley, N1BUG, <www.n1bug.net>.

With all of the above information, you should be well on your way to joining meteor-scatter communications. I hope to see you among the growing ranks of "ping jockeys" in the wonderful world of VHF+ frequencies.

Northwest Treated to Rare European Opening

Sunday morning, June 10, saw a rare European opening into the northwest part of the U.S. and southwest corner of Canada. Dave Bernhardt, N7DB, reported the following to the VHF reflector: "First station to work EU this morning was K7RAT about 1720 UTC on 50.130. I actually heard Tree making contacts from .125, as I was listening for KLØRG at the time. Not paying that much attention as it sounded like he was running MS with W6's. Was I ever wrong!

"As far as I can recall, EU stations heard here were from 50.130 down to 50.095 or so. Lot of confusion at the time, hard to really settle down and collect data. Cannot give an exact time, but the conditions closed down by around 1815. Once the local folks figured out what was going on, many others swung their beams NE. Other known stations to work into EU include NN7J (x-WA7BJU), KB7WW, and after 37 years of trying, K7RWT. ON4GG and ON4ANT were heard here Q5, but no contact.

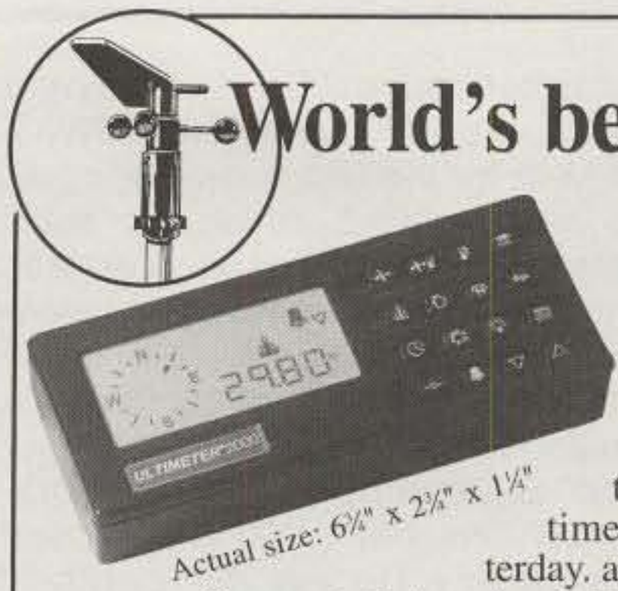
"Last night saw some good auroral-*E* to the East Coast, and some more geo-activity was seen this morning (no aurora here). No classic indicators were seen for the European path—no TV signals or beacons. Europe was noted on the prop page to the East Coast, about all for indicators. Just got word that European video was heard in Arizona this morning too.

"For those outside of this region, Europe is really an unknown continent on 6 meters. I recall W7FFE (SK) telling me he worked/heard EI2W on F2 back in the '50s. I have heard a rumor that K7KV has worked Europe from eastern WA (not confirmed here). I heard W7HAH (SK) working Europe via EME (or at least this end). There was a report that I was heard once via long path on F2 in PA. NN7J was reported being heard in Europe via F2 backscatter last fall. To the best of my knowledge, this is it."

In addition, Mike Reed, KD7TS, reported that VE7DXG/P and ON4GG exchanged reports during the opening.

Next Day JA Opening To West Coast

On the heels of the European opening to the U.S. northwest came the season's first



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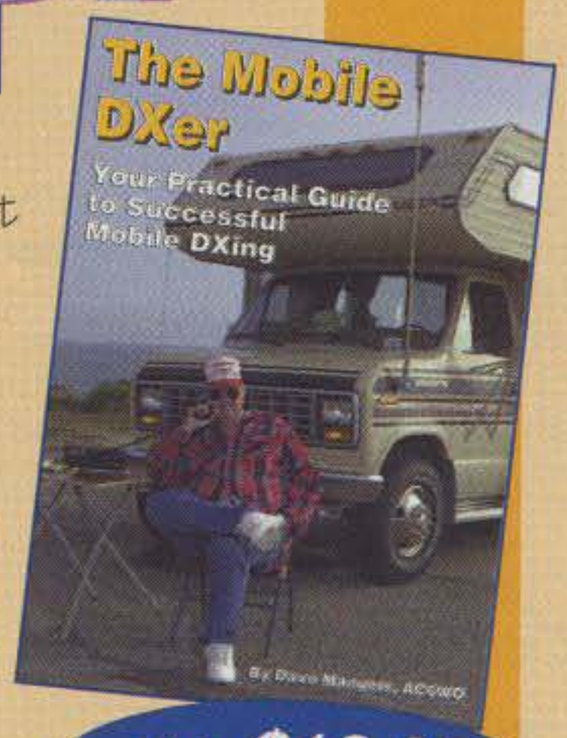

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JA opening the next day. Again, Dave Bernhardt, N7DB, reports: "First JA opening for the summer season in the Pacific Northwest occurred today. This opening did not have our usual indicators—that is, no KL7 to start things out. Rather, NN7J heard 48.250 MHz video peaking 315 degrees late in the afternoon.

"First indication was W7EW working JG2BRI at 0425 UTC. Band was quiet for almost an hour before signals were back with a vengeance. Although the JAs seemed to just stick to one frequency, some signals were up to S9 here. Hope next time they tune up the band.

"I got one station up on 50.140 MHz, JHØMHE 5/7 at 0537 UTC. The band dropped out and came back around the top of the hour. Then I worked JJ3AZA/1 559 at 0603 UTC.

Chip Margelli, K7JA, reported that at 12 June 0555 UTC he worked JH7MSB QM08 on 50.099 CW, multi-hop sporadic-*E*.

Current Contests

The ARRL UHF and Above contest is scheduled for August 4–5. The first weekend of the ARRL 10 GHz and Above Cumulative contest is scheduled for August 18–19. The second weekend is September 15–16. Complete rules for both contests can be found in July *QST*.

Current Conference

The 2001 annual Eastern VHF/UHF Conference will be held on August 31 and September 1–2 at the Radisson Hotel in Enfield, Connecticut. A possible URL to check for information on the conference is: <http://uhaweb.hartford.edu/newsvhf/vhfconf.html>.

Silent Keys

The following is courtesy the *ARRL Letter* and Derwin King, W5LUU:

Joe C. "Pat" Patterson, W5VY (SK): VHF pioneer and ARRL member Joe C. "Pat" Patterson, W5VY, died May 9. He was 93. In the 1940s Patterson was active on 50 MHz and 144 MHz AM and achieved many firsts. Patterson made the first 50 MHz contacts from the U.S. to Uruguay and France. In June 1950 he worked W8WXV on 144 MHz for the first known 2- meter contact via sporadic-*E*, which also set a new distance record for that band. He was one of the first to work all states and more than 100 countries on 50 MHz. He also made some of the earliest contacts via satellite and was active on 432 MHz.

"Shep" Shepherd, W7HAH (SK): Francis "Shep" Shepherd, W7HAH, passed away on 15 May. He was 79. Shep held VUCC on 50, 144, and 432 MHz. His 50 MHz certificate was endorsed for 625 grid squares. Shep was the leader of the 2 meter EME roles for contacts with a four-Yagi system. Dozens of tributes to Shep were posted on the VHF and Moon reflectors following his death. A ham's ham and a true gentleman of our hobby will truly be missed by all of us weak-signal operators. As a continuing tribute to Shep, an effort is being made to secure his callsign for a club that will continue to operate his beacon. Hopefully, by the time you read this column, that goal will have been met.

Herb Adams, K6BTO (SK): On June 10 Herb Adams, K6BTO, became a Silent Key. For regular readers of this column Herb should be familiar for a couple of reasons: Herb was Frank Adams, AE6L's father. For me, Herb was my Elmer for my entry into the VHF+ frequencies.

Herb lost his life because his failing health was exacerbated by an automobile accident this past March, from which he never fully recovered. He survived Frank by barely nine months. I wrote about my childhood friend, Frank, in last September's column. Now I share my thoughts about Herb. The following slightly updated and modified tribute is from the introduction in *The VHF "How to" Book*.

My exposure to the VHF+ frequencies goes back to my early days in ham radio, when I spent many nights hanging around the shack of Herb Adams, K6BTO, in Bonita, California. Herb had every imaginable piece of equipment from every radio surplus store in San Diego County. I remember how much it meant to him to be able to modify a piece of gear so he could talk clear across town.

Once I asked Herb why he bothered operating on the high frequencies when he could get on the low bands any time he wanted and talk anywhere in the world. He replied that wasn't always the case. He said that in ham radio's early days, radio operators couldn't talk very far because they didn't know how. Eventually they found a way to increase their range, and now it was up to him and other radio pioneers to discover how to use these higher frequencies effectively.

Even with Herb's explanation, however, in my novice way of thinking I responded that it seemed an incredible amount of work just to find out how to communicate across town, and maybe there just wasn't any way to work anyone much farther away. Herb brushed off my negative comments. Instead, he regaled me with tales of bouncing signals off the Moon, or talking to other stations on 2 meter meteor scatter, or seeing a fellow ham on amateur television.

My introduction to weak-signal work came again in the late 1980s as I reentered the world of the VHF+ ham bands with my purchase of a Kenwood TR-751 and my first contacts via meteor scatter and tropo from my home QTH in Oklahoma City. It has been refined during my tenure as your editor.

Even with my re-entry into the VHF+ bands I never forgot my roots. I never forgot Herb, which is why I gave tribute to him in my book. Thanks to this column and the book, happily I re-established contact with the Adams' family and was able to present them with copies of my book several years ago.

Now I salute Herb and thank him once again for all that he meant to me as my Elmer, mentor, and friend over the many years of our having known one another.

And Finally . . .

While in my version of Chicken Little there is no Foxy Loxy, there is a Piggy Wiggy. That animal can be found on the calling frequency hogging that frequency during contests and major openings, such as meteor showers. I noticed a technique that is picking up popularity and I hope more will adopt it—calling CQ on the calling frequency but announcing another frequency where one is listening. It works well, and I hope some of the Piggy Wiggys will become better hams and try it out.

As my list of silent keys attests, we are losing too many of our heroes of the hobby. I suggest that while they are still with us, some of us spend time with these senior heroes and listen to their stories. After hearing them, you can transcribe them and send them to me and I will in clude them in this column. Let's work on this worthwhile project.

73, Joe, N6CL

Oops ...

This month: A Collection of Callsign Calamities to Correct!

We gave the wrong callsign to July's cover "model." *CQ* Contest Hall of Famer Rush Drake of La Center, Washington, is W7RM, not K7RM. Also in the July issue, we messed up the callsign of *CQ* Amateur Radio Hall of Famer Martin F. Jue. He is K5FLU, not W5FLU.

Finally, back in the February issue, in the "Moonbounce Primer" article (p. 52), we said 20 meter EME Net Control Lionel Edwards is VE7BHQ. He's not. He's VE7BQH.

Our apologies to Rush Drake, David Ellis (the real K7RM), Martin Jue, and Lionel Edwards. And tnx to eagle-eyed readers K1AR, N1RL, and K6PF for catching the errors. It sure is a good thing we're not in charge of issuing callsigns!

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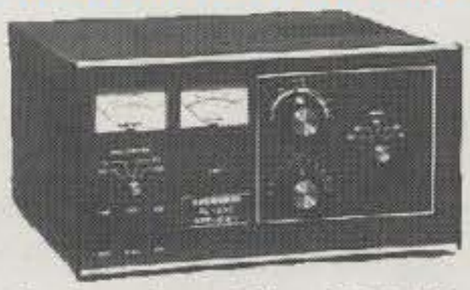

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Math's Notes

BY IRWIN MATH, WA2NDM

What's New And How To Use It

Wireless Audio

This month I would like to introduce you to a new series of integrated circuits manufactured by Rohm Electronics and just introduced in the spring of this year. The chips are the BH1414/BH1415/BH1416 series of FM stereo transmitters and are intended to implement a complete FM stereo transmitter. Originally designed to create a low-cost wireless link between audio devices such as FM tuners, CD players, auto radios, and amplifiers, the series can also be used to produce a two-channel (L and R) audio link for various audio/control applications.

All devices feature an on-chip pre-emphasis and limiter, a low-pass filter for frequency-tailoring purposes, a phase detector, and oscillator/amplifier combination. The oscillator is designed to cover the FM band from 75 to 110

c/o CQ magazine

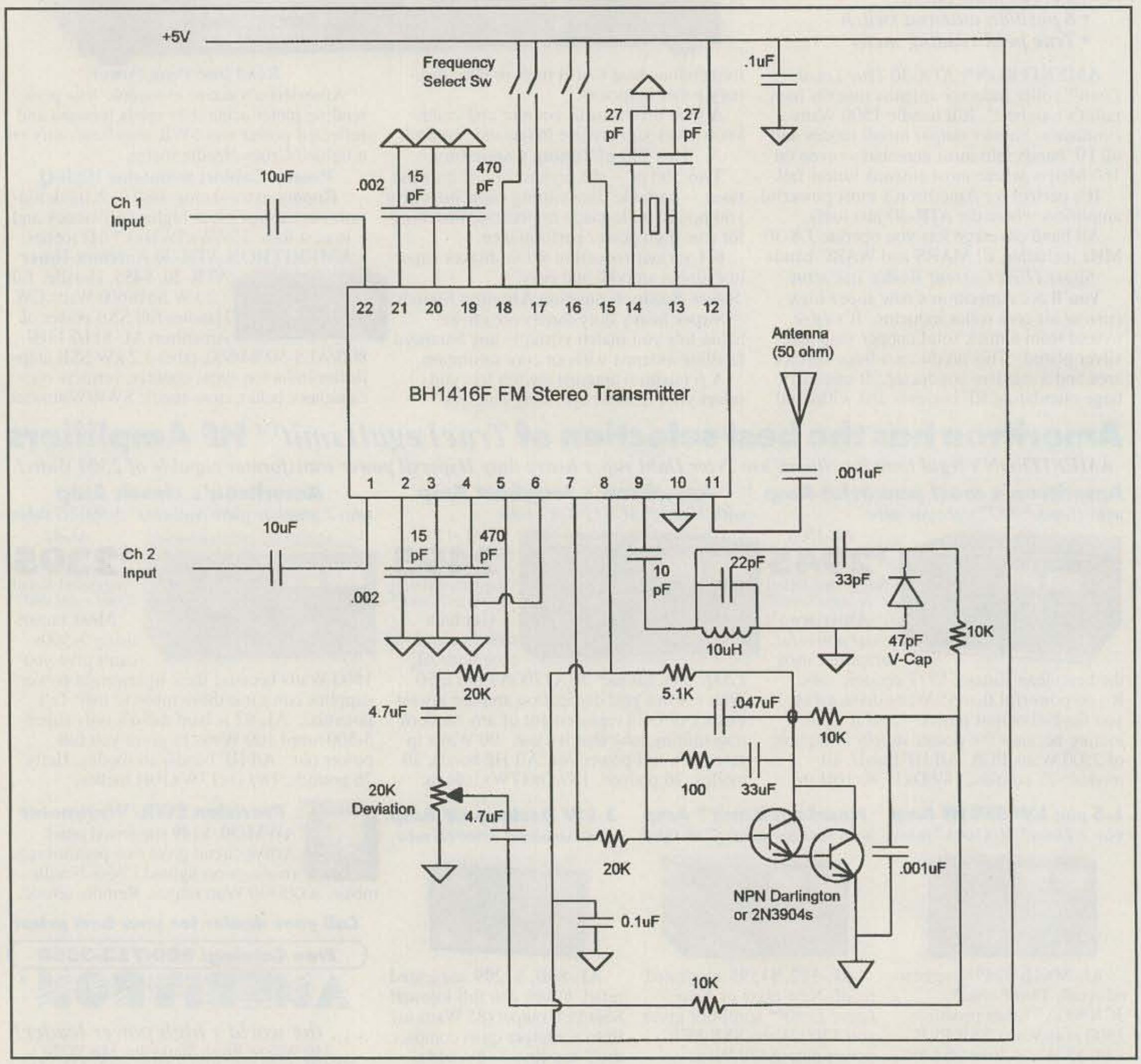

Fig. 1– Simple FM stereo transmitter using BH1416F.

MHz, but probably can be trimmed into the 6 or 2 meter band with some experimentation. Although stereo is not what one normally would want to transmit on a ham band, perhaps two audio channels offer some unique experimental opportunities (audio plus tone-encoded controls, for example). Separation between the two channels is about 40 dB, and therefore transmitting audio on one channel and tones on the other certainly should be possible with little or no crosstalk problems.

Fig. 1 is a schematic of the typical application circuit for the BH1416F, the simplest of the series. You will note that each audio input goes to a separate amplifier and limiter, is mixed in the chip, and appears as a stereo signal at pin 5. Prior to combining the two channels, a user-configurable pre-emphasis circuit and low-pass filter (one for each channel) can be set for the desired overall audio frequency response. For FM stereo applications this is set for fidelity. For communications purposes these can be set for best voice response. Since there are two separate circuits, each channel can be set independent of the other.

A 7.6 MHz crystal oscillator along with an LC tuned Colpitts oscillator (configured from the Darlington transistor) varicap, and various components associated with pins 7 through 14, generate the final RF carrier. The RF and crystal oscillator are internally coupled by means of a phase-locked loop so that overall stability is excellent. The switches shown connected to pins 15, 16, 17, and 18, by the way, are used to select the exact desired output RF operating frequency in accordance with a chart printed on the data sheet. The stereo-encoded audio is applied to the varicap in the phase-locked loop through a 20K deviation-setting capacitor and produces the desired degree of FM modulation of the carrier as a function of the setting of the pot.

Since all circuitry is contained in a tiny 22-pin surface-mount chip (SOP-22), power output, as you might gather, is not very high. The manufacturer indicates an output level of only 100 dBµV or 100 millivolts into 50 ohms (1/4 milliwatt), but you can always add an amplifier stage (with a Mini-circuits MAR amplifier, or something similar) if you require more power. The BF1416F itself is really tiny and operates from a 5 volt supply, only drawing 20 to 30 milliamperes. In addition, it is rated for full operation from –40 to +85°C, so it is quite suited for battery-powered outdoor applications.

Other chips in the series are the BF1415 and BF1414. These are similar in function but more complex, being designed for the use of microprocessors for controlling the various functions and frequencies. Cost was not yet available at the time this column was written, but based on similar products from Rohm, and its large-volume commercial intent, we assume the BF1416F is under $10 in small quantities.

If you plan to use any of these chips, you should be sure to visit Rohm at their website, <www.rohm.com>, for details.

73, Irwin, WA2NDM

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Digital Wireless

BY STEVE STROH, N8GNJ

Packet Radio and Beyond

Dayton 2001—Briefly

For me, Dayton 2001 was all too brief. Due to a longstanding family commitment, I was only able to attend the Dayton Hamvention on Friday and flew home to the Seattle area on Saturday morning.

The main casualty of my brief stay was any attempt to visit the fleamarket other than to indulge in my favorite Hamvention food, grilled bratwurst. This actually worked out well, because Friday featured some of the worst weather that I've *ever* seen at a Hamvention, and most of the attendees crowded inside, causing the temperature (and humidity) to soar. The mud ruts in the "parking fields" surrounding the Hara Arena were amazing; tow trucks were standing by to rescue the unlucky vehicles that became mired. Inside though it was business as usual.

The TAPR Forum on Friday from 10:00–12:45 was well attended, with interesting presentations on the latest happenings with TAPR and its projects. Some highlights:

• The project generating the most interest is the kit production of the W7PUA software-defined radio (SDR). The first 100 kits will be offered for sale during the summer of 2001

• The TAPR EasyTrak antenna rotor controller is still in progress, but due to the intense interest in AO-40, plans to release EasyTrak have been accelerated.

• The TAPR Frequency Hopping Spread Spectrum radio is making steady progress. The hardware of the digital board has been debugged for the most part, and it's likely that a new (development) revision of the digital board will be done this summer, allowing greater progress to be made on testing and debugging of the RF board

• TAPR will be offering a digital voice board based on the work of Charles Brain, G4GUO. A demonstration of the resulting voice quality (a loopback jumper was used to digitize and then "analog" a speaker's voice) was offered.

• It was planned to include APRS with the TAPR presentation, with offerings from many speakers shoehorned into a 45-minute slot, but in the last two weeks before Dayton an open slot on Sunday was found for an APRS-only presentation. As I wasn't present, I can't offer any report from the APRS session.

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e-mail: <n8gnj@cq-amateur-radio.com>

Major Digital Events

Call for Papers for the ARRL and TAPR Digital Communications Conference is early August 2001 (exact cutoff date is to be determined). For more information, see <www. tapr.org/dcc>, which includes contact/submission information and paper guidelines. I'd like to take this opportunity to emphasize that anyone can write and submit a paper (and a subsequent [optional] opportunity to present it) for the DCC. It does not have to be of "scholar" quality. It should be readable and relevant to the topic at hand—Digital Wireless Communications.

The ARRL and TAPR Digital Communications Conference (DCC), September 21—23, 2001, Cincinnati, Ohio. I simply cannot recommend the DCC highly enough. It's an entire weekend of total immersion in the digital aspects of amateur radio. Papers are presented, and there is ample opportunity for networking (of the personal kind) and meeting like-minded experimenters and developers. Of special note, in response to numerous requests the National APRS Seminar has been extended to an all-day session on Friday. Extensive information on the DCC is available on TAPR's conference web page at <www.tapr.org/dcc>. As with the Dayton Hamvention, attendance at the DCC is highly recommended.

Vendor Highlights

After the TAPR forum I tried to visit at least briefly all the vendor booths inside the Hara Arena, and later spent some time in the TAPR and *CQ* booths. Some impressions:

• It's usual that the APRS booths are crowded, but this year the description "crowded" doesn't do them justice; the area was packed and mobbed, and as a result I wasn't able to see much. There were a number of new APRS-related products introduced, including new versions of APRS software for most platforms. Byon Garrabrant, N6BG (BYONICS), announced the Tiny-Trak II, new features of which include altitude and smart beaconing, plus "corner pegging"—sending a transmission when there's a significant change in direction. John Hansen, W2FS's new products include a PS/2 keyboard adapter for the popular Kenwood D700 radio and a PIC-based "KISS TNC."

• TAPR offered a new version of its Compact Flash Adapter that can accommodate an IBM Microdrive (a hard disk drive with the same form factor as a Compact Flash card) which offers storage capacity up to 1 GB.

• In the main display area of the Hara Arena (the "hockey rink"), there was an entire row of German companies, among which were SYMEK Datensysteme und Elektronik GmbH. SYMEK was offering its TNC3S high-speed, dual-modem packet radio controller; TNC31S and TNC31SX high-speed packet-radio controller; and most impressive, TRX4S 435 MHz high-speed data transceiver. The TRX4S offers speeds of up to 153.6 Kbps for real; this is a purpose-designed, no-compromises, complete (no transverter needed) digital radio. I'll be devoting much of a future column to discussing the SYMEK products, but it was heartening to see SYMEK at Dayton.

• A product that I had been awaiting for some time finally appeared at the CQ Communications booth—a complete set of *Ham Radio* magazine CD-ROMs in three volumes (1968–76, 1977–1983, and 1984–1990). *(See CQ's ad for them elsewhere in this issue.—ed.)*

• *The New RTTY Journal* began offering *RTTY Journal* Archive Discs CD-ROMs in eight discs, from 1953 through 1997.

• Kantronics previewed (not yet available for sale) their KAM XL multi-mode DSP-based controller, including a PSK-31 mode and two radio ports.

• CQ Communications announced their "Inaugural Class" of the CQ Amateur Radio Hall of Fame. In creating the inaugural list, CQ Communications did some catching up, inducting wireless pioneers such as Nikola Tesla, Lee DeForrest, and Al Gross, W8PAL. Among the 50 names are two well-known digital pioneers—Tom Clark,

W3IWI, and Phil Karn, KA9Q (who remarked, when shown the list, something to the effect "Nice to be one of the few on the list who are among the living.").

• Timewave displayed a number of enhancements to its product line, including a sound-card interface upgrade for the venerable PK-232, a DSP upgrade for the PK-232, and a DSP upgrade for the PK-900. Timewave's continuing support for the PK-232 may well make the PK-232 one of the longest-lasting digital controllers in amateur radio history. Serious kudos to Timewave for offering its catalog of products on a CD-ROM; it's a mystery why other amateur radio manufacturers and dealers with extensive product lines don't offer CD-ROMs of their catalogs.

• Alinco displayed its new DR-135 (2m) / 235 (222 MHz) / 435 (UHF) series of radios that claim 9600 baud capability and an optional 9600 baud TNC. We're particularly interested in the DR-235, as the Seattle area has one 222 MHz 9600 baud repeater nearly converted (from a 1200 baud) and another (currently portable) soon to go on the air from a permanent location.

• WiNRADiO Communications announced new versions of its PC-based wideband radio receivers, including first-ever versions for Macintosh and Linux, as well as a version with a USB interface.

• AMSAT-NA released an updated version of the *AMSAT-NA Digital Satellite Guide* by Gould Smith, WA4SXM, and contributors.

Packet Bash and More

Friday evening was the annual Packet Bash banquet, co-hosted by TAPR and the Miami Valley FM Association. The food was good, and the featured speaker was TAPR's Steve Bible, N7HPR, who spoke on software-defined radios and their "big picture" meaning for amateur radio. Steve spoke extensively about the DSP-10 kit that TAPR will be producing, and how it allows amateurs to become experimenters once again, as the focus of RF shifts from hardware (which is increasingly difficult for amateurs to develop) to software (which is increasingly easier for amateurs to develop). In software, amateurs can easily create new modes, new modulation techniques, signaling techniques, adaptive systems . . . the list is literally endless. With the ease in sharing of new, experimental code via the internet (as has been well demonstrated with the rise of PSK31), coupled with the possibilities of relatively low-cost soft-

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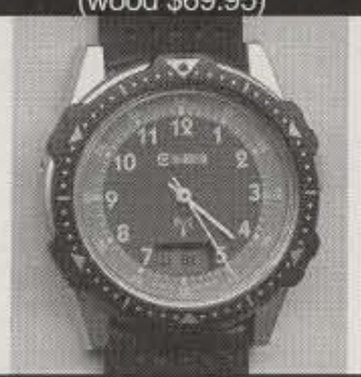
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ware-defined radios, it's possible for new radio communications systems to evolve rapidly.

If you have not attended a Hamvention recently or have never been to one, you really do owe it to yourself as an amateur radio operator to attend. The sheer diversity of equipment and expertise and the opportunity to come face to face with other amateurs is rare. For example, it was quite a thrill for me to meet with Roy Neal, K6DUE, and Bill Pasternak, WA6ITF, when they stopped at the *CQ* booth. I've admired and enjoyed Roy and Bill's work on behalf of amateur radio for many years, and it was a real honor to be able to shake their hands and tell them so.

Costs to attend the Hamvention are surprisingly affordable if you plan ahead. Many hams split the cost of a hotel room, and air travel to Dayton can be reasonably priced if full advantage is taken of fare specials and advance reservations. I recommend arriving Thursday to be able to attend the event all day Friday.

Digital Wireless Field Day

I've often described how I "fell in with a bad crowd" of digitally-minded hams when I moved from Ohio to the Seattle area in 1987. Of course, I mean this in a humorous way, and it's been a very rewarding association.

In our first summer in Seattle, my wife and I were invited to join a tradition of attending the ARRL Northwestern Division Convention held in Seaside, Oregon in early June. For us city (well, suburban mostly) dwellers, a trip to Seaside is a good excuse to leave town for a long weekend and relax in a resort town near the Pacific Ocean on a stretch of coastline that is particularly scenic. In marked contrast to most amateur radio gatherings, visiting Seaside is a distinctly family-friendly experience, so it's popular all around. There are plenty of amateur radio activities for ham, and plenty of things to do for those who aren't really into amateur radio.

Part of the tradition is that lots of us bring "toys" to share—radios, computers, software, etc. Over the last five or so years the event has evolved into something of a ritual that I thought would be fun and instructive to describe.

Seaside is fairly small. Many of the hotels are in the downtown area, spread out over not much more than a square mile or so, and many are multi-story. "Wetnet Mafia" members all have their favorite hotels. Some (mostly single) opt for splendid beach views (pricey), and some opt for more economical lodgings (no beach views). Like most hams, we bring radios. Like most digitally-inclined hams, we also bring laptops. I'm sure you can guess what's coming. . . .

Some of the most fun we have is getting most of the group connected to each other in multiple ways via radio. Voice communications is a given (simplex is easy), but of course we have to "gadget" somewhat and set up one or more multi-band radios to cross-link multiple simplex frequencies. Digitally, things are considerably more complex. In years past we've used Ethernet hubs to link multiple laptops and PCs into a network. One of us usually obtains local dial-up internet service for the weekend, and the phone is dialed in to the ISP for the weekend. The internet connection is shared out on the Ethernet via a Linux box (which provides automatic "private" IP addresses via Dynamic Host Configuration Protocol—DHCP).

In 1999 we brought a portable 222 MHz 9600 baud repeater and several radios crystalled for the repeater. Via the repeater and other links such as APRS, we link up other systems in other hotels. A typical Saturday evening on a Seaside weekend finds at least half a dozen of us in whatever hotel room is the "hub." There are Linux compiles and installations going on, and nonstop music pouring out of another PC that has gigabytes of MP3 music files. A number of CD-ROMs are being burned. Several laptops are in use fetching mail over the internet. The digital repeater echoes APRS packets from the national APRS network. You can probably get the picture.

In 2001 we tried using 802.11b wireless LAN devices. Results were mixed. The good news is that with 802.11b equipment it was relatively easy to network a number of computers together both vertically (multiple floors) and horizontally (different rooms on the same floor) in the hotel at which many of us were staying. The bad news is that we tried using an Apple AirPort as the hub (It would dial up the ISP and share the internet connection.) and simply could *not* get it to work despite many attempts.

The Bigger Picture

It was only after several years of being a part of this ritual that I was able to have a "bigger picture" view of what this gathering is—a different kind of Field Day. Unlike the ARRL Field Day, where the assumption is that no infrastructure of any kind has survived the (fill in the blank) disaster, this gathering assumes

that some infrastructure would survive, especially on the edge of the disaster (and why this scenario is aptly described as the "Edge of the Disaster") scenario. With the ability to connect to the internet *somehow,* internet communications can be established via radio *into* the disaster from the "bridging" equipment at the edge.

Several of my co-conspirators had their appetites whetted about the possibilities of 802.11b equipment, and coincidentally, on the trip from Seattle to Seaside I had visited an Internet Service Provider that is entirely wireless. They use 802.11b equipment to provide connections to businesses at speeds equivalent to DSL via wireless. The equipment they use is compact and relatively inexpensive.

Thus, one of my background projects for the coming year is to put together a portable 802.11b system suitable for the purposes described above. I already have some of the pieces. One is a portable fiberglass mast that telescopes from 3 ft. to over 30 ft. With a goodly amount of duct tape and a balcony (my wife already reserved a prime third-floor corner room at our favorite Seaside hotel) and a lightweight 2.4 GHz omnidirectional antenna, it should be possible to provide internet access for blocks, enabling laptops with nothing more than 802.11b cards to have access to the internet. Another piece I have is the "power system," which is the Statpower Xpower system I described in the May issue. Yet another part is a "Dial on Demand" router, which is my (now discontinued) Ramp Networks WebRamp M3, with an external modem.

Wearing one of my other hats (writing about Broadband Wireless Internet Access), I talked briefly to an ISP in the Seaside area, and it was interested in the possibility of using wireless. In 2002 we well may try to link up between the "portable" system at the hotel and the ISP's Point of Presence (POP). At the ISP we'll probably use a directional antenna, and at the hotel we'll most likely use an omnidirectional antenna.

Of course, we'll be doing other digital activities as well. Several of our group have come close to bringing complete HF systems with them, and with some minor encouragement they'll probably bring systems complete enough to do PSK-31 and other digital modes (now that laptop PCs are coming equipped with powerful-enough sound subsystems). Likely we'll have the 9600 baud 222 MHz repeater back, and with the internet connection we'll probably have an operational (temporary) APRS Igate online to provide ample connectivity to all the APRS systems in the area.

Publishing Notes

As I announced in this column, I was gratified to be asked to join the TAPR Board of Directors. Among many other changes that TAPR is undergoing, the longtime editor of the *Packet Status Register* (*PSR*), Bob Hansen, N2GDE, announced his retirement, and I was asked to take over the editorship of the *PSR*. I was very honored to be asked to edit the *PSR,* a publication I have admired for nearly 20 years. Among the challenges the *PSR* will face is a move to electronic publication.

With regard to the "Digital Wireless" column in *CQ,* after careful consideration and some missed deadlines because of other projects with which I am involved, Rich, W2VU, and I decided that having this column appear bimonthly, at least for the near future, is best for all concerned, so you can look for me here again on the pages of *CQ* in the October issue.

As always, comments and questions on these and other topics are welcomed.

73, Steve, N8GNJ

Web Pages of The Month

(Blush) . . . Steve Stroh, N8GNJ's Advanced Amateur Radio: <www.strohpub.com/hamradio.htm>

I've been compiling a list of web pages on "Advanced" Amateur Radio. Primarily that means digital, but not exclusively so. It's growing and evolving, and in future columns I'll simply mention some of the more interesting additions to the page. In addition, I hope to begin posting digital photographs I take at events such as the Dayton Hamvention. Being mostly a "words" guy, doing a reasonable job of posting photographs will be yet another new challenge!

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BY DAVE INGRAM, K4TWJ

The Art of Low-Power Hamming

More Good News and New Rigs

The good times and new goodies just keep on coming in QRP, and each year's low-power extravaganza at Dayton continues to substantiate that fact. In May at the Dayton Hamvention folks reveal neat homebrew projects they developed during prior year, companies reveal exciting new gear, and another season of super QRP'n gets underway. Will the fun quiet down anytime soon? No way! QRP is on a roll, plus the gear is affordably priced so everyone can enjoy the pursuit. One example of that statement that comes to mind is SGC's new DSP-upgraded SG-2020 transceiver, which was revealed at Dayton this year. Inside details on the little treat plus more news and views of QRP fun follow, so read on!

Photo A– "But officer, I was only running QRP!" Does officer KB5ULK believeYL N5UPT? Read the full story in the text!

But Officer . . .

Okay, gang, we sense your curiosity. Photo A shows Debbie Salas, N5UPT, XYL of mildly addicted QRPer and occasional *CQ* contributing writer Phil Salas, AD5X, attempting to talk her way out of a rather ticklish situation. Policeman Dave Fox, KB5ULK, accepts her explanation of the SGC-2020 transceiver on the car's dashboard, but is suspicious of the exceptionally large antenna on the car's rear deck. Is there a secret automatic-tuning and high-power SGC linear amplifier hidden in the trunk? Only OM AD5X knows for sure!

SGC-2020 Update and Upgrade

A few short years ago I had the pleasure of bringing you a first-hand report on a new little SSB/CW transceiver from SGC called the SG-2020. Now, after a seemingly long time of silence and observation, I am delighted to bring you an updated report and inside details on a new version of the 2020 introduced at Dayton 2001. The upgraded version has improved T/R switching, an exceptionally smooth CW keyer, and Adaptive Digital Signal Processing or ADSP, and it works like a champ! Say facts and features of the original SG-2020 have sort of slipped from memory and you could use a quick refresher? No problem. Refer to photos B and C, and I will highlight the unit's special points.

SGC's SG-2020 is a 160 through 10 meter SSB and CW transceiver with 20 memories and up to 20 watts of output power. It includes general-coverage reception (with BFO always "on") IF shift, noise blanker, RIT, split-frequency operation, built-in keyer, VOGAD speech compressor, and digital audio filters of 2.7 kHz to 100 Hz bandwidth—and now Adaptive Digital Signal Processing (ADSP). The transceiver measures only 3"H × 6"W × 7.5"D and is enclosed in an exceptionally rugged case that feels as if it could survive being run over by a car. The rear panel is flat and slightly recessed without protrusions or a heat sink (the sink is built in), so it can be mounted vertically, horizontally, or against a backstop/shelf or even carpet without concern of overheating.

Both original and upgraded version 2020s look and operate in the same general manner. That is, functions such as selecting bands, output power, keyer speed, audio filters, and/or adjusting the passband tuning involve pressing a front-panel button and rotating the main tuning knob—nice and easy. Some owners of early-version 2020s found T/R switching time and related relay "chatter" slightly objectionable, so both aspects have been improved in the new version of the 2020. T/R delay time has been changed so it switches back to receive between Morse letters semi-QSK style when using the built-in keyer at speeds above 15 wpm. When using a bug or hand key, however, the rig switches back to receive between dots and dashes full QSK style. A key and a paddle can be plugged into front sockets and used separately or simultaneously.

In chatting with other QRPers on the air, I've noticed a creditable number of operators use and abuse 2020s daily, and they seem to hold up very well. Few folks have been interested in trading them for other rigs, but that may change as new versions with Adaptive Digital Signal Processing hit the scene. The 2020's ADSP, incidentally, is fully automatic. You just press the "CMD" and "BW" buttons to toggle it on/off, and it sets its own noise level plus notches out heterodynes or "tune up" signals. The automatic noise-reduction feature is quite effective on both band and mobile noises, allowing you to hear signals that otherwise would be almost impossible to copy. The notch filter reminds me of those electric "bug chasers" folks use in the country. When a pesky tune-up tone comes on frequency, it zaps 'em gone in a flash!

Although the 2020 is well-established as a deluxe QRP rig, it also strikes me as the ideal mobile transceiver. Indeed, 20 watts is low enough to avoid interfering with a car's computer system but high enough to work DX like a 100 watt rig. I have also found the 2020's small size permits easy mounting in spots too tight for other "ultra compact" transceivers. One example of that fact is the "aft gearshift lever" mounting idea shown in photo C. I just place a small, padded wooden platform (actually a 7" × 9" decoupage plaque from Wal-Mart)

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Ranger Communications again sets the standard for value with a multi-mode, 6 Meter transceiver that is long on performance and short on price. The RCI-5054DX is perfect for the newly licensed ham who wants to try his hand at local FM operation as well as the experienced DX enthusiast who wants an economical SSB or CW 6 meter rig featuring a quiet receiver, all-mode squelch, extensive shielding and the performance and reliability that up to now you could only get with the multi band "high dollar" rigs.

The RCI-5054DX covers the full 6 meter band with an output power of 10W RMS or 25W PEP. Like the popular RCI-2950DX 10 & 12 Meter rig, the RCI-5054DX also has programmable repeater split (up to ±2 MHz in this model), optional CTCSS tone, 10 frequency memory and two programmable scanning modes. Add a large easy to read display and you have the perfect rig for home, mobile or field day. At a suggested retail price of only $329.00, the RCI-5054DX is an excellent buy for new or old hams alike.

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Photo B– Original and newly upgraded versions of SGC's popular SG-2020 transceiver look the same. Improved T/R switching, iambic keyer with dot/dash memory, and Adaptive Digital Signal Processing (ADSP), however, give the new version a noticeable edge in overall performance.

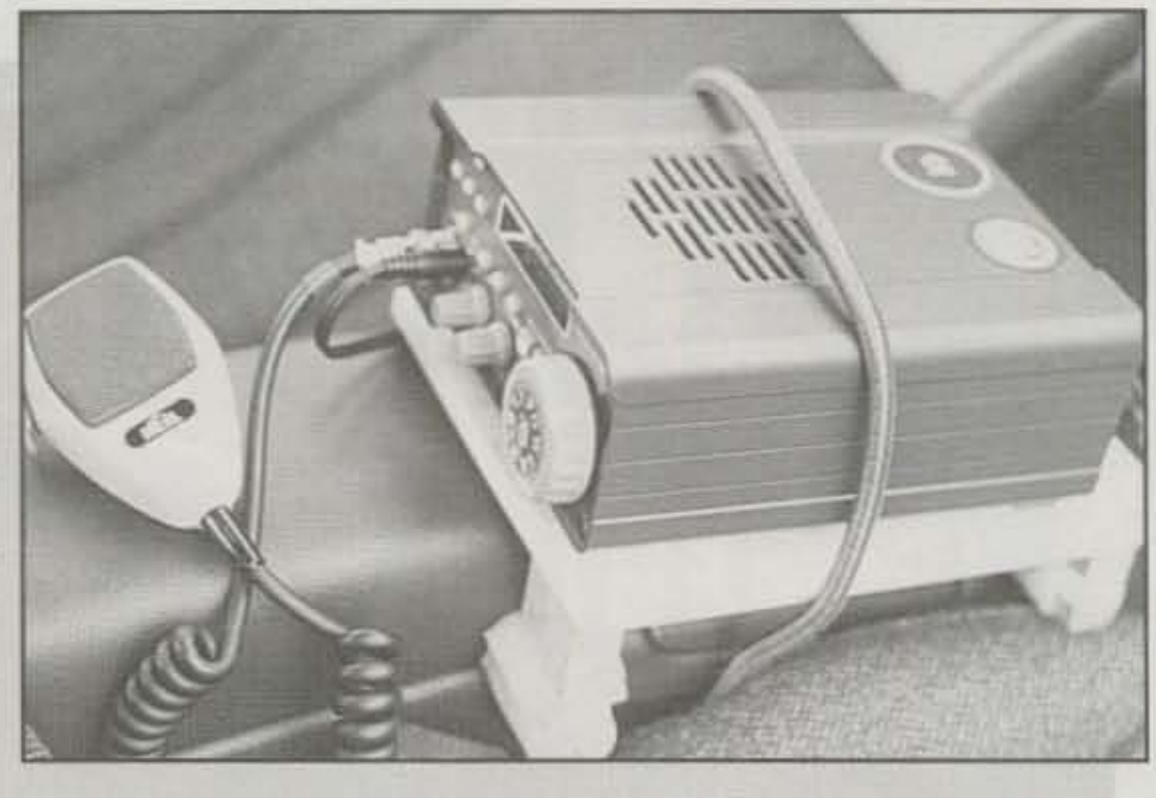

Photo C– Thanks to its exceptionally small size and flat rear panel, the SG-2020 opens up new dimensions in mobile mounting possibilities. One example is this "behind gearshift lever" position. Add a new Heil hand mic (one wired for a Kenwood is a plug-in match), and you have one of the best sounding low-power SSB signals rolling!

on the console and strap the rig onto it with two bungee cords. One end of each cord stays hooked under the console, and the wood plaque stores under the seat when not in use. When "going mobile," I just place the plaque and rig on the console and hook the cords together. Since cables, plugs, and sockets are easily accessible, rig installation and removal is a two minute cinch. An extra mobile speaker is not even necessary, as the 2020's top-mounted speaker is in the best possible position.

Overall, I think SGC's ADSP-upgraded SG-2020 is a winner, but don't just take my word for it. Check out one first hand and see for yourself!

Now let's talk about club fun.

Club News

Do you remember to carry a camera to those special club meetings? Members of the CQC (The Colorado QRP Club) support the idea, and they recently passed along a couple of quite interesting views of their activities to share with everyone (photos D and E). The pictures were taken during Key Day 2001, a "show and tell" event with members bringing, displaying, and talking about more than 50 different keys, bugs, and paddles. Now that's big-time enthusiasm from any point of view! A variety of transceivers, antennas, and other accessories also received attention at the meeting and allowed folks to check out a few of the keys in actual on-the-air operation.

One particularly interesting and memorable item displayed was a classic Bud "Codemaster" two-tube code-practice oscillator shown on the right side of the table in photo D. Looking clockwise around the table from there, we see a round-cylinder-enclosed Hy-Mound paddle/keyer and a spiffy long-arm/enclosed mechanism Amplidan key at the 6 and 7 o'clock positions. A miniature QRP paddle made by W3ZVT sits on the Amplidan's left side. It is flanked by a cool-going Palomar/Ham Key combo unit at 9 o'clock and a miniature enclosed-mechanism Russian key. A "Junior Telegraphist" paddle, a homebrew brass-and-plastic paddle, and a classic German "Junker" key are positioned between 10 and 11 o'clock on the table.

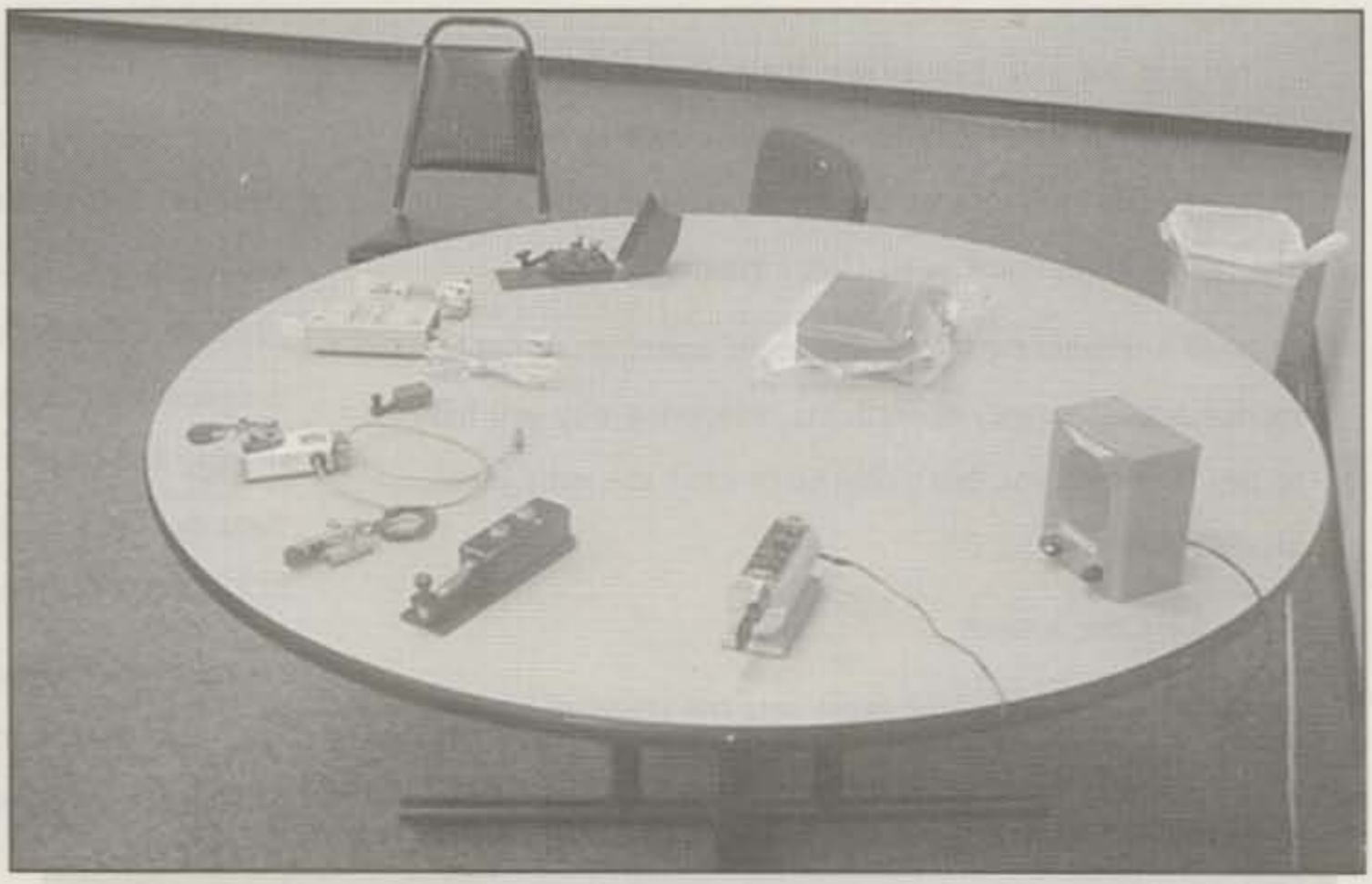

Photo D– One of the three tables used for displaying goodies at The Colorado QRP Club's annual "Key Day" meeting. Items on this table include a Bud Code Practice Oscillator on the table's right, Hy-Mound paddle/keyer at 6 o'clock position, Palomar keyer at 9 o'clock, and famous German "Junker" key at 11 o'clock. Remaining keys are discussed in the text.

Photo E– Is there a QRPer among us who would not delight in sitting down to this classic Heathkit HW-8 and famous German "Junker" key setup? It was a big attraction at CQC's "Key Day" 2001. Junker keys, incidentally, are available from the Morse Express. (Details in text.)

The previously mentioned Hy-Mound is a model "UFO" that includes a built-in keyer with top adjustments, and it is a real showpiece. The Amplidan looks similar to a European-made NATO key and may still be in production. Most long-arm keys, incidentally, have a quite elegant feel. If you ever get a chance, check out one. Many folks remember the Palomar/Ham Key unit; it handled well, had an external 9 volt battery clip, and was popular in the late '70s.

In photo E the 7.75" × 3.25" Junker (pronounced "yoonker") key with its mechanism's cover open so it can be studied more closely is shown alongside another classic QRP item, a Heathkit HW-8. Now that's what we call genuine QRP at its golden best! Just thinking about using a setup like that makes you feel like a kid again, doesn't it? Heathkit HW-8s in good working condition have become rather scarce, but authentic German military Junker keys are available (while the supply lasts) from The Morse Express (2460 South Moline Way, Aurora, CO 80014; telephone 303-752-3382 or <www.MorseX.com>). The keys sport a "click-stop" knob for gap adjustment and a left-side tension screw that raises or lowers a tiny platform beneath the key's spring. Junkers also represent a significant piece of radio history.

QRP in Perspective

Casual investigators often visualize QRP as a weak-signal-type pursuit (really?), but seldom consider precisely what constitutes a weak-signal level and/or how low it can drop before blending with band noises. Driven by that curiosity, Bob Rosier, K4OCE, conducted a study of levels and compiled the results in the chart shown in fig. 1. The chart is based on the fact that every doubling or halving of a previous power level is equivalent to a 3 dB change and 1 S-unit is equal to approximately 6 dB. The S-meter on some transceivers may vary here, but you can quickly reference/calibrate/check them as follows.

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Power (Watts)	S9 + 20	S9 + 10	S9	S8	S7	S6	S5	S4	S3
1000	0.63	6.3	63	251	1	4	16	63	251
900	0.56	5.6	56	226	0.9	3.6	14.3	57	226
800	0.5	5	50	201	0.8	3.2	12.7	50	201
700	0.44	4.4	44	176	0.7	2.8	11	44	176
600	0.38	3.8	38	151	0.6	2.4	9.5	38	151
500	0.32	3.2	32	126	0.5	2	7.9	32	126
400	0.25	2.5	25	100	0.4	1.6	6.3	25	100
300	0.19	1.9	19	75	0.3	1.2	4.8	19	75
200	0.13	1.3	13	50	0.2	0.8	3.2	13	50
100	0.06	0.6	6	25	0.1	0.4	1.6	6	25
	MILLIWATTS				WATTS				
dB above S2	62	52	42	36	30	24	18	12	6
Example: I am running 600 watts & receive a report of S6									
I can drop my power to 2.4 watts & still be copied (the power of a standard flashlight)									
Double your power = 3 dB or 1/2 S-Unit				Ten times your power = 10 dB or 1 2/3 S-Units					
1000 Milliwatt = 1 Watt or 1 Milliwatt = .001 Watt								By K4OCE/QRP	

Fig. 1– This "how low can you go" chart was compiled by Bob Rosier, K4OCE, and is quite useful for estimating S-meter readings at a distant receiver. Plot your rig's power on the left/vertical column, your received signal report on the top/horizontal row, and then trace where the two intersect to determine the lowest power you can use to produce an S2 signal at a distant receiver.

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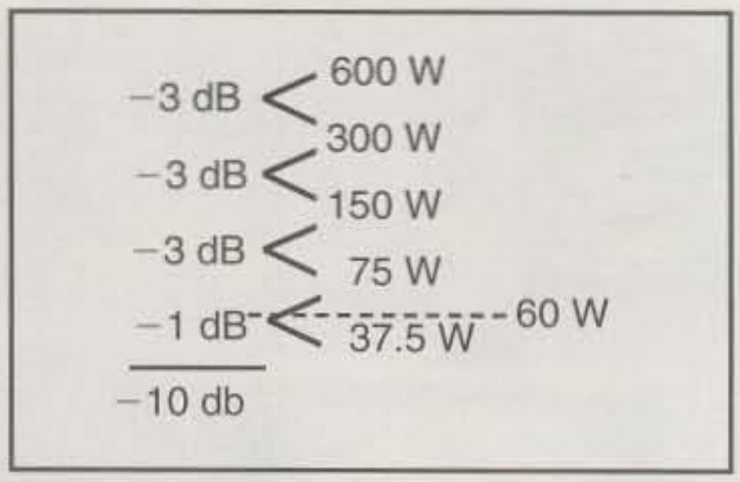

Fig. 2– How to use the '3 dB rule" discussed in the text to quickly estimate signal levels. Dropping 600 watts to 300 watts is one 3 dB loss; dropping 300 to 150 watts is a second 3 dB loss, and dropping 150 to 75 watts is a third 3 dB loss. Separate distance between 75 and 37.5 watts into thirds and then add total dBs used.

Tune in a signal that registers S7, S8, or S9, and then switch in your rig's 10 dB attenuator and note the new S-meter reading. If it dropped by 1.5 or 1.7 S-units, then 1 S-unit is equivalent to 6 dB. If the reading dropped by 3 S-units, then 1 S-unit is equivalent to 3 dB. If the station you originally tuned in (with the rig's attenuator "off") was running 600 watts, he dropped 3 dB to 300 watts, 3 more dB to 150 watts, and 3 more dB to 75 watts, plus 1 final dB (10 total) to 60

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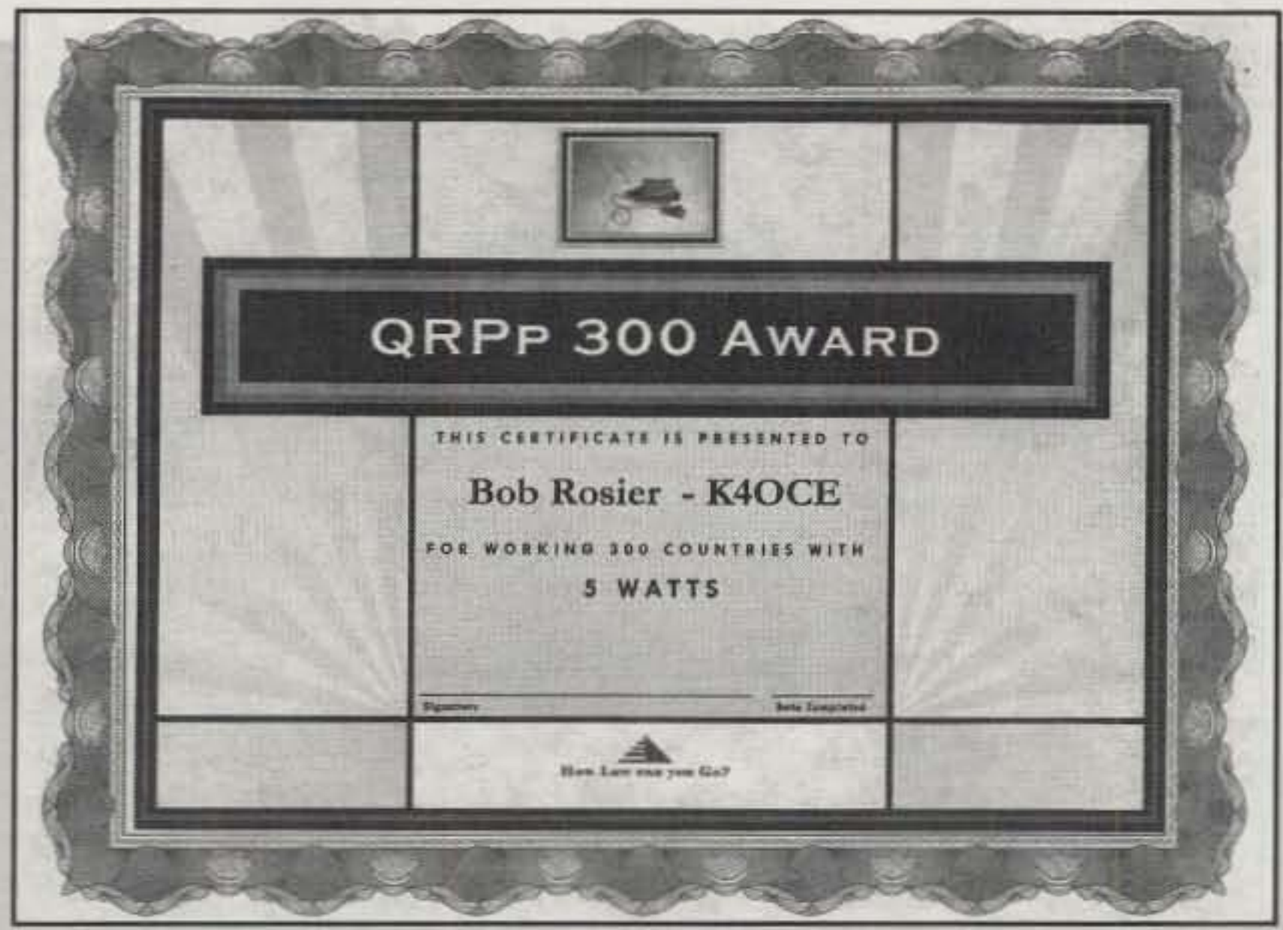

Fig. 3– Are you a hopelessly addicted QRPer? Check out this attractive award offered by Bob Rosier, K4OCE, to any amateur working 300 countries while running 5 watts or less.

watts. This "quick estimation technique" is illustrated in fig. 2.

Would you like to double check your rig's attenuator and/or S-meter for accuracy or to confirm your measurements? Tune in a signal registering 10 or 20 dB over S9 and then switch your rig's 10 or 20 dB attenuator into use. The meter reading should drop to 10 dB over S9 or exactly S9.

Can a 5 watt signal really stand so loud and proud? Yes indeed, and that is what makes QRP'n so much fun! If you really get hooked on QRP, incidentally, K4OCE also offers a neat award (fig. 3) available to any station working 300 countries while running 5 watts or less power, a feat that is quite attainable at our present high point in sunspot activity. To apply for the award, send your list of countries/stations worked with calls, QSO dates, bands, and modes plus one dollar (in U.S.) to cover postage to Bob Rosier, K4OCE, 7723 Rocking Horse Lane, Fair Oaks Ranch, TX 78015. Need more details? Bob's e-mail is <k2cbb@flash.net>.

QSY

That wraps up the new and views for this time, gang, but stay tuned for more good notes, tips, and QRP encouragement in October *CQ*. Meanwhile, I urge you to spend more time on the air while sunspot cycle 23 is in its prime and all the HF bands are in top condition (You can work, eat, and sleep later!). This is the best season for QRP'n we have seen in years. Join the fun and remember to listen for me, too. I will be the weak one running QRP. 73, Dave, K4TWJ

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Washington Readout

BY FREDERICK O. MAIA, W5YI

Regulatory News In The World Of Amateur Radio

Preparations for WRC-2003 Shift into High Gear

"In today's fast-moving environment, membership of the International Telecommunication Union gives governments and private organizations a unique opportunity to make an important and valued contribution to the developments rapidly reshaping the world around us. ITU membership represents a cross-section of the telecommunications and information technology industry, from the world's largest manufacturers and carriers to small, innovative new players working in new fields like IP networking. Founded on the principle of international cooperation between government and the private sector, the ITU represents a global forum through which government and industry can work towards consensus on a wide range of issues affecting the future direction of this increasingly vital industry." —Quote from ITU

Samuel Morse sent his first message over a telegraph wireline between Washington and Baltimore in 1844. Ten years later telegraphed communications became the rage. In an instant, messages covered distances that took stagecoaches, pony express riders, or locomotives days, or even weeks, to span.

There were problems, however. Telegraph lines did not cross national frontiers. Each country used a different system, and each had its own telegraph code to safeguard the secrecy of its military and political communications. That meant messages had to be transcribed, translated, and physically handed over at national frontiers before being retransmitted over the telegraph network of the neighboring country.

It is not surprising, therefore, that in 1865 twenty European countries entered into an agreement to interconnect their national networks. They decided on common rules to standardize equipment, adopted uniform operating instructions, and laid down common international tariff and accounting rules.

The first radio frequency allocations were made in 1927 to the five radio services existing at the time. They were the fixed, maritime, and aeronautical mobile, broadcasting, amateur, and experimental radio services.

The International Telegraph Union, established in Paris on May 17, 1865, and the International Radiotelegraph Union, established in Berlin in 1906, merged into the International Telecommunication Union (ITU) in Madrid in 1932. In 1947 the ITU became a specialized United Nations agency and its headquarters was moved to Geneva, Switzerland. The goal of the organization is to extend, improve, and promote all forms of international telecommunications.

Today, after more than 135 years, the reasons which led to the establishment of the ITU still apply, and the fundamental objectives of the organization remain basically unchanged. In a sentence, the ITU is a worldwide organization which brings together governments and industry to coordinate the establishment and operation of global telecommunication networks and services.

Membership in the ITU is open to governments, which may join the Union as Member States, as well as to private organizations such as carriers, equipment manufacturers, funding bodies, research-and-development organizations, and international/regional telecommunication organizations, which can join ITU as Sector Members.

At present, ITU membership includes 189 different countries and over 650 "Sector Members." All United Nations member countries are automatically members of the ITU. Those which are not UN members may be voted in by two-thirds vote.

In 1993 the ITU was remodeled into three sectors. They are the Telecom Standardization Bureau (commonly referred to as ITU-T), the Telecom Development Bureau (ITU-D), and the Radiocommunications Bureau (ITU-R).

The ITU-T mission is to ensure an efficient and on-time production of high-quality standards covering all fields of telecommunications except radio. At present, more than 2600 Recommendations (Standards) encompassing some 60,000 pages are in force. The purpose of the Telecommunication Development Sector (ITU-D) is to promote the advancement in telecommunications worldwide.

According to the ITU, the objective of the Radiocommunication Sector is "...to ensure rational, equitable, efficient, and economical use of the radiofrequency spectrum by all radiocommunication services, including those using satellite orbit, and to carry out studies and adopt recommendations on radiocommunication matters." The objective is achieved through periodic international telecommunications meetings called World Radiocommunication Conferences (WRCs) and the approval of recommendations.

WRCs used to be called World Administrative Radio Conferences (WARC) and were held about every 20 years. However, with telecommunications technology changing so quickly and being so important to the global economy, they now are assembled every two or three years.

The next one, to be held in 2003, will be considering (among many other things) the Article S25 international regulations governing the Amateur Service, the first "top-to-bottom" revision of the international ham radio rules in many decades. It is anticipated that Morse code proficiency as an international prerequisite to HF operation will be eliminated at WRC-03. Another topic of major interest to hams will be the possible realignment of 40 meters to separate hams and broadcasters.

WRC-03 is scheduled to be held between June 9 and July 4, 2003. Originally to be convened in Geneva, WRC-03 will probably be moved to Caracas, Venezuela, since that nation has volunteered to host the meeting. The agenda for this conference was approved at WRC-2000 in Istanbul, Turkey.

Advisory and Study Groups

Each of the three ITU bureaus has various Advisory and Study Groups. The most recent ITU Advisory Group meeting impacting amateur radio was held in Geneva in mid-March of this year. The purpose of the meeting was to establish a new Informal Group in preparation for WRC 2003, to seek information on various Regional preparations, and to develop an agenda. All discussions are informal and participants speak in an individual capacity, not on behalf of their country or organization.

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e-mail: <w5yi@cq-amateur-radio.com>

Regional WRC-2003 preparations are also underway by APT (Asia-Pacific Telecommunity), CITEL (Inter-American Telecommunication Commission), CEPT (European Conference of Postal and Telecommunication Administrations), and ERO (the European Radiocommunications Office). There is also an Arab Group which has not yet begun operation.

The U.S. is a member of CITEL, an affiliate of the Organization of American States (OAS). CITEL has meetings scheduled for June 11–15, 2001 in Ottawa (Canada), and September 17–21, 2001 in Guatemala, just before the IARU Region 2 conference.

The Study Groups represent a major aspect of ITU-R activities. More than 1500 specialists from telecommunication organizations and administrations around the world participate in the work of the Radiocommunication Sector's eight study groups.

ITU-R Study Group 8 (SG8) covers "Systems and Networks for the Mobile, Radiodetermination, Amateur, and related Satellite Services," and is chaired by C. Van Diepenbeek of the Netherlands. (T. Mizuike of Japan, V. A. Strelets of the Russian Federation, and R. L. Swanson of the United States are Vice-Chairs.)

Each Study Group is further separated into subsidiary "Working Parties" (WP), "Task Groups" (TG), and "Rapporteur Groups" (RG). Each addresses a particular topic item. All WRC preparatory work is to be completed by May 31, 2002.

The recommendations of each Study Group are then summarized into a CPM (Conference Preparatory Meeting) Report and circulated to the various ITU members six months before the Conference starts. It will be hundreds of pages long! You can follow WRC-03 progress at the ITU's website located at: <http://www.itu.int/brconf/wrc-2003/index.html>.

ITU-R Working Party 8A

...is considering specific amateur radio issues. The International Amateur Radio Union (IARU) has developed a document entitled "Minimum qualifications of radio amateurs," ITU-R M. [RAM. QUAL]" which has been introduced into Working Party 8A with the objective of having the various administrations of the world accept it.

These new amateur radio qualifications are proposed to be "mentioned" in the ITU regulations but published in another volume, a so-called "Incorporation by Reference" strategy. The theory is that it is easier to change future qualifications if they lie outside of the international radio regulations. Following is the latest revision of the "IARU – WP 8A" proposed amateur radio operator qualifications.

ITU-R\SG-R\SG08\WP8A – PDNR M-[RAM.QUAL]
PRELIMINARY DRAFT NEW RECOMMENDATION

The ITU Radiocommunication Assembly,

considering

a) that No. S1.56 of the Radio Regulations (RR) defines the amateur service as: A radiocommunication service for the purpose of self-training, intercommunication, and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest;

b) that No. S1.57 (RR) defines the amateur-satellite service as: A radiocommunication service using space stations on earth satellites for the same purpose as those of the amateur service;

c) that certain minimum operator operational and technical qualifications are necessary for proper operation of an amateur or amateur-satellite station,

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recommends

1. that administrations should take such measures as they judge necessary to verify the operational and technical qualifications of any person wishing to operate an amateur station;

2. that any person seeking a licence to operate an amateur station should demonstrate theoretical knowledge of:

- **Radio regulations**
  - * international
  - * domestic
- **Methods of communications**
  - * radiotelephony
  - * radiotelegraphy
  - * data and image
- **Radio system theory**
  - * transmitters
  - * receivers
  - * antennas and propagation
  - * measurements
- **Radio emission safety**
- **Electromagnetic compatibility**
- **Avoidance and resolution of radio frequency interference**

Notice that there are no specific requirements listed at all, leaving the determination of what constitutes sufficient knowledge to each country's government. Here is what CITEL has published to its North, Central, and South American members regarding the Amateur Radio agenda items:

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The International Amateur Radio Union (IARU) has conducted an in-depth review of Article S25 and their position takes into account the wishes of all amateurs around the world as expressed by their national societies. ITU-R Working Party 8A is considering a proposed Preliminary Draft New Recommendation submitted by the IARU on Amateur Service and Amateur Satellite Service Operator Qualifications which could replace some of the regulatory text currently contained in S25. Consideration will need to be given to the position developed by the IARU to ensure it conveys CITEL interests. Article S19 with respect to the formation of amateur callsigns will require review and possibly revision in order to increase flexibility for assignment by administrations.

The 40 Meter Band

The second important WRC-2003 issue involves a possible realignment of the amateur and shortwave broadcasting bands around 7 MHz on a worldwide basis. At present, there is an overlap between the two services.

High Frequency (HF) Broadcasting, also known as Shortwave Broadcasting, is a radio service licensed by the FCC to operate between 5,950 kHz and 26,100 kHz. This is an international broadcast service where transmissions are intended to be received by the general public in foreign countries.

Due to the nature of the shortwave propagation, these broadcast signals propagate very long distances and are subject to interference from HF stations around the world. As a result, the HF frequency bands are extremely congested (particularly the lower frequency ranges). The worldwide demand for usable HF frequencies far exceeds the capacity of the allocated frequency bands.

Amateur allocations have been based, in part, on the desirability of having a choice of relatively narrow frequency bands with different propagation properties distributed throughout the spectrum. The amateur 40 meter band is the major communications medium between 4 and 14 MHz.

At the present time, amateurs in ITU Region 2 (the western hemisphere) have a band of 300 kHz, from 7000 to 7300 kHz, while amateurs in the rest of the world have only 100 kHz, from 7000 to 7100. In those countries the rest of the band from 7100 to 7300 is allocated to Shortwave Broadcasting.

Until 1938 the 7000 to 7300 kHz segment was a worldwide amateur allocation. Since then the upper portion of the band has been gradually transferred to the HF Broadcasting service in Regions 1 and 3, so that since 1979 only the band 7000 to 7100 kHz is, for the most part, available for amateur use worldwide. It is the IARU's belief that a minimum worldwide Amateur Service 40 meter allocation of 300 kHz is required.

Recommendation 718 at WRC-92 asked that the ITU at a future conference consider the possibility of aligning amateur and broadcast allocations around 7 MHz so as to provide for separate worldwide allocations. WRC-2003 agenda item 1.23 includes Recommendation 718.

To reduce sharing with HF broadcasting in the 7100–7300 kHz band, a 300 kHz band aligned worldwide around or at 6900–7200 kHz is being sought by the IARU, with HF broadcasters operating above 7200. A 300 kHz wide 40 meter amateur allocation also has the support of the National Telecommunications and Information Administration. (The NTIA is the White House advisor on telecom matters.)

An FCC "preliminary view" indicates that 6900–7200, or as an alternative 7000–7300, should be supported by the United States. However, it will not be easy to obtain this allocation, and there is much opposition from global HF broadcasters and fixed-service operators. Some broadcasters would like amateurs worldwide at 6800—7100 kHz so they would not have to move. Also, we have heard rumors that ITU members in Regions 1 and 3 (the rest of the world) may be willing to settle for an Amateur Service expansion to 200 kHz (from 7000 to 7200 kHz) and support a worldwide Broadcast allocation from 7200 to 7300 kHz as a trade-off. This would double the 40 meter ham band in the Eastern Hemisphere but decrease the band in the Americas by 100 kHz.

Amateur Radio Callsigns

A third issue of lesser importance involves amateur radio callsigns. The callsigns of all radio stations are very closely regulated by the ITU so that the various countries and radio services can readily be recognized by their callsign format.

All of the "three letter" and "one numeral and two letter" international callsign prefixes except those beginning with the letter "Q" and the numerals "Ø" (zero) and "1" have been allocated by the ITU to various countries. "Q" is not used because a callsign might be confused with a telegraphed "Q-code" abbreviation. However, since radiotelegraphy has been phased out in the Maritime Mobile Service, an ITU resolution adopted at WRC-95 seeks to allocate international callsign prefixes beginning with Q, Ø, and 1. (We have

not been able to determine why the numerals zero and one may not be used as country prefixes.)

By ITU regulation, all amateur callsign country prefixes must begin with:

1. two letters followed by a digit (such as "VE1" for Canada),

2. a digit followed by a letter—which may not be "Ø" or "I"—and another digit (such as 4X4 for Israel), or

3. a letter followed by a digit and another letter (such as C6A for the Bahamas).

4. Only the following single letters may precede a digit and up to three suffix letters: B, F, G, I, K, M, N, R, and W. Only the first character is required for nationality identification—for example, K1 in the United States. (This is because all other letter/number ITU prefix combinations are shared among different countries.)

Only the Amateur Service may use the numerals "Ø" and "1" anywhere in a callsign. No other radio service may use them at all! In addition, you will never see a four-letter suffix. The ITU restricts amateur callsign suffixes to no more than three letters. All special event amateur callsigns must conform to the ITU format.

Some of these rules may change, since WRC-2003 agenda item 1.7.2 seeks a "...review of the provisions of Article S19 concerning the formation of callsigns in the amateur services in order to provide flexibility for administrations."

Informal Working Group 6

In February of this year the FCC's International Bureau formed its WRC-2003 Advisory Committee which is further subdivided into Informal Working Groups. Each of these IWGs brings together government and private industry representatives. The purpose of the Advisory Committees is to assist the Commission and the Department of State in developing a U.S. position on all agenda items being considered at WRC-2003.

Amateur radio matters are being handled in the IWG-6 "Public Protection and Other Issues" committee, which already has had several meetings at FCC headquarters. The Vice Chairman of this committee is ARRL Technical Relations Specialist Walt Ireland, WB7CSL. Ireland previously was with the Voice of America, an HF broadcaster. IWG-6 is handling other telecom issues besides those involving amateur radio. The chairman of this committee is Larry Miller of the American Association of State Highway and Transportation Officials.

The objective of these meetings is to develop a Preliminary View (PV) on each issue. You can follow the activity of IWG-6 by connecting to the FCC's WRC-03 website at: <http://www.fcc.gov/wrc-03/welcome.html>. The United States delegation to WRC-2003 will take the recommendations of their advisory groups into consideration when arriving at a final U.S. position. You can also find a copy of the WRC-2003 agenda posted to this website. Preliminary Views issued so far recommend (as mentioned above) U.S. support for a realigned 40 meter amateur allocation at 6900–7200 kHz, but no recommendation has yet been made regarding the international licensing requirements.

The work of these various committees will continue through the next year and a half or so, during which time their recommendations will be refined and developed into the official recommendations of the ITU and official positions of various governments on those recommendations. We will keep track and keep you posted. 73, Fred, W5YI

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Public Service

BY BOB JOSUWEIT, WA3PZO

Public Service and Emergency Communications

Summer Preparedness and Fun

It's the middle of summer. Rolling blackouts and other sorts of power failures have become a fact of life in some parts of the country. Chances are hams are being called on to fill in when power problems disrupt vital emergency communications, and chances are the hams are responding well to the challenge. Those "Field Day generators" might be finding additional uses this summer.

This month we take a look at how some members of Army MARS are practicing for "the big one," a West Coast earthquake, and learning how to be of service in case of terrorist attacks. We'll also see how some hams out west are helping scouts have fun.

Air Force MARS operator relays important information. (Courtesy Air Force Communications Agency)

MARS operators have a long history of supporting those who serve in the military.

Power Problems

"Rolling blackouts caused by a real power shortage are problem enough for California right now," said James Banks, KK7RV/AAA9W, Army MARS Western Area Coordinator, "but nature's arsenal threatens an even worse electrical emergency in the future—an earthquake knocking generating stations and power distribution networks totally out of action."

This past spring hams who belong to Army MARS (Military Affiliate Radio System) tested their readiness to handle such a crisis affecting states from the Great Lakes to the Pacific. They were joined by Air Force and Navy MARS members as well as National Guard units, the Federal Emergency Management Agency, the National Weather Service and state Emergency Operation Centers. They were assigned to cope with the grim results of a major earthquake in the Pacific Northwest.

Solar Storm Adds Challenge

Banks and his assistant coordinator for emergency operations, Steve Carver, N7VVW/AAM6O, of West Valley City, Utah, said the six-day exercise included not only widespread simulated commercial power outages, but also a breakdown of overloaded landline communications. Nature added its own challenge to the drill by delivering a major solar storm which severely hindered communications. However, those participating still managed to deliver over 2000 messages to Banks's headquarters. The messages were originated by members of the Army, Navy, and Air Force MARS services in 19 states stretching from Ohio and Michigan to California, Oregon, and Washington. Banks reported a total of 87 emergency nets operated. A total of 162 Army MARS stations, two Navy MARS stations, and two Air Force MARS stations participated in the exercise.

The scenario called for every other hour of operation to be conducted using emergency power, from storage batteries to mobile units. "The major purpose of the exercise was to identify areas of weakness and need of improvement within the western area," Banks reported. "Many lessons were learned and problems were identified." One of the biggest was propagation.

"Due to the solar flare affecting the passing of traffic via digital channels, e-mail was used to pass much traffic," Banks said. "Although e-mail is not the preferred method for Army MARS, it is a backup means of communication. HF and VHF digital modes were used to the fullest as propagation permitted."

Among the lessons, according to Banks: "It was noted that communicating and passing traffic is important, but knowing what is happening in your neighboring states is just as important. State and region nets must be opened for neighboring states and regions to make contact for possible assistance."

A New Priority

The Military Affiliate Radio System is a Department of Defense sponsored program, established as separately managed and operated programs by the Army, Navy, and Air Force. The program consists of licensed amateur radio operators who are interested in military communications. In a real emergency, Banks explained, the MARS members' tactical assignment is two-fold: "First, notifying the Pentagon of details of the situation in case military assistance becomes necessary; and second, establishing backup communications for the military and other federal activities ... State, regional, and area networks train constantly to fulfill the latter mission," said Banks. "Area gateway stations at Ft. Huachuca, Arizona and Ft. Detrick, Maryland remain on the air around the clock monitoring so-called '911' frequencies."

Traditionally, MARS members handled so-called "morale and welfare"

c/o CQ magazine
e-mail: <wa3pzo@cq-amateur-radio.com>

messages between service members and their families. Preparedness for backing up federal communications in emergency situations is a new priority. An Army MARS Bulletin issued at the beginning of this year said, "We need to become familiar with the new threats we will face, namely, terrorism possibly using weapons of mass destruction (chemical, biological, or nuclear) and how to respond to them. To do this we need to start learning the unusual vocabulary associated with them like microcuries, HEPA filters, botulism, or seran gas."

Interoperability is essential in that mission. Take, for example, an emergency incident in Hawaii. A message may start out on Army MARS in Hawaii, be relayed to Maryland, and end up with the Air Force MARS national emergency coordinator in the Air National Guard at South Portland, Maine. The message might travel via Clover, Pactor, VHF packet, and possibly PSK31. Relay across digital nodes normally is automatic. Currently there is a North East Packet System under construction. It involves all three MARS services.

Army MARS member Edgar Whittaker "made the suggestion that we form a communications group to share information," recalled AF MARS assistant national digital manager Mitch Hill. "Charlie Rousseau (Navy MARS) suggested that we should investigate interoperability and sharing the resources, including the extensive repeater system Navy-Marine Corps MARS has developed. It was a golden opportunity." Bob Bohn, AF MARS state director for Massachusetts, was the key promoter to bring a lot of areas together.

"The credit for all this needs to be spread well around and shared with regional and state MARS directors right down to the members of all services who have been a part of making this all come together and work. It has truly been a cooperative effort," said Hill.

Scouts and Hams Head for the Hills

Last month scouts and hams in 11 western states headed for the highest point they could find and attempted to contact each other using mirror signals. The Venturing and Varsity Scouting "On Target" event allowed the Scouts and hams to get out in the field and have some fun. Some of the scouts climbed a mountain; others drove to a peak. Some climbed a tall building while others rode a ski tram to the top of a mountain. Once they reached their destinations, the scouts used mirrors to signal each other. The mirror-flash sightings were confirmed with either cell phones or ham radio. The contacts were plotted on a map to see how many other teams each team could contact and how far the mirror flashes could be relayed. While results weren't available at deadline, a challenge was issued to go from Denver, Colorado to the Pacific Coast and from the Canadian border to the Mexican border *(sounds like a great introduction to ham radio contesting!—ed.).*

While many of the teams used their cellular phones to confirm their mirror flashes, others had to rely on ham radio since they were out of cell-phone range. Since all of the contacts were within line of sight, a 2 meter HT provided verbal acknowledgement of the mirrors being flashed. Many western U.S. repeaters are linked together, allowing radio coverage over large portions of a state or states. The Snowbird linked repeater system covers most of Utah and parts of Idaho, southwestern Montana, southern Nevada, and southwestern Wyoming. Each repeater system had a Net Control Station (NCS) that helped coordinate communications between teams.

The Net Control stations assigned simplex frequencies for the teams to meet on to exchange their mirror reports. In addition, they had to relay traffic between teams with cellular

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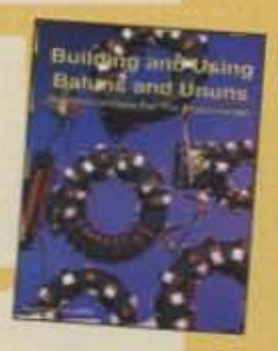

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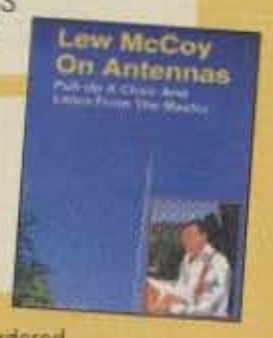

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MARS—A Long, Proud History

The Army Amateur Radio System (AARS) was started by members of the United States Army Signal Corps in November 1925. Capt. Thomas C. Rives enlisted the talents of volunteer amateur radio operators as a source to train soldiers in the then new technology of radio. He envisioned the hams helping with radio research and development to improve radio equipment within the Army. AARS continued until the United States entered World War II, at which time hams were not allowed on the air.

According to Army MARS records there were approximately 60,000 hams in December 1941. Some 5600 hams were members of AARS. Of those, approximately 20% entered the military. Following the war AARS was reactivated and the Military Amateur Radio System was created in 1948. This was later renamed the Military Affiliate Radio System (MARS), with Army MARS and the newly formed Air Force MARS reflecting the creation of the Air Force as a separate service. In early 1963 the Navy-Marine Corps MARS was established.

For further information on MARS check out the following web pages:

Army MARS:
<http://www.asc.army.mil/mars>

Air Force:
<http://public.afca.scott.af.mil/public/mars1.htm>

Navy Marine Corps MARS:
<http://navymars.org>

phones. Once the teams made their contact on simplex, they returned to the net frequency and reported their success.

Benefits of Ham Radio

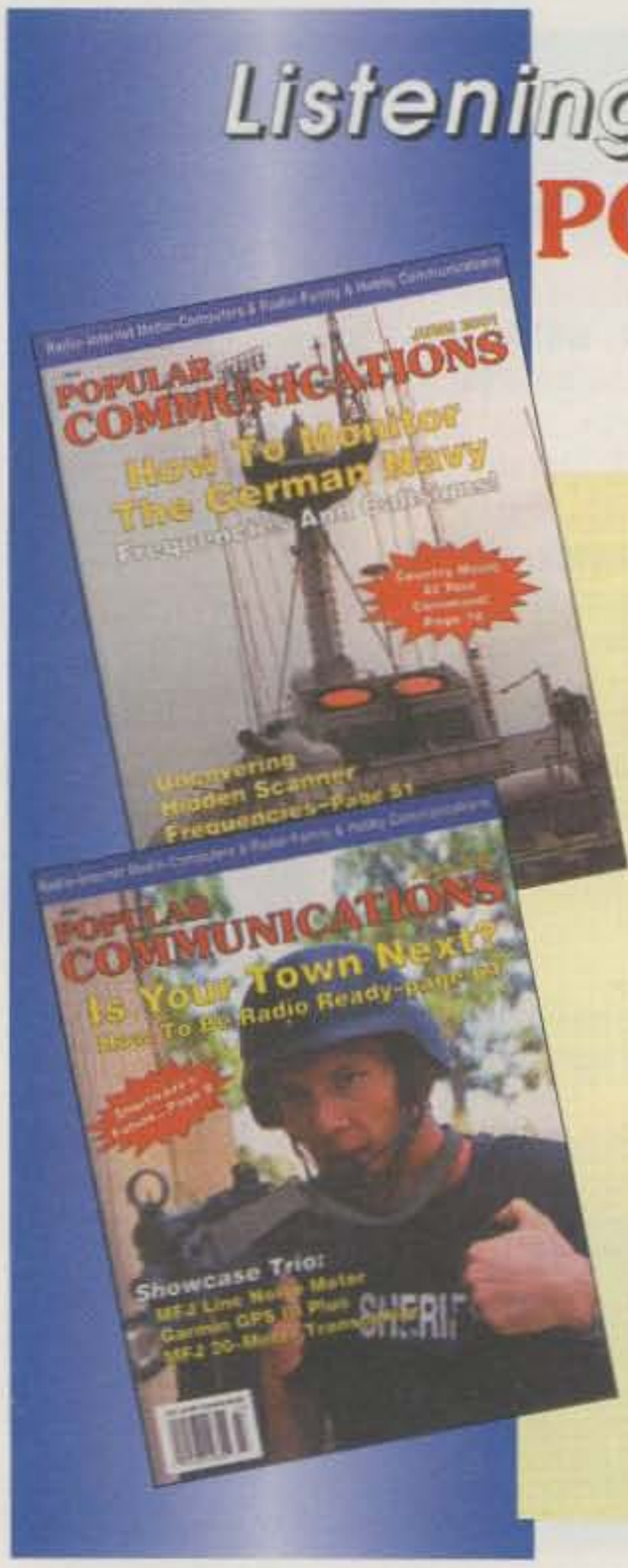
The scout team members learned communication skills which can be applied toward the Radio Merit Badge. Some scouts wanted to learn more about ham radio. When the scouts use ham radio they can be in contact with several teams at once. In telephone terms they can experience one big party line with no busy signals. Those who have been out on the event say it's a great way to plant the seeds of interest in amateur radio in some young people as well as their adult advisors.

No hill nearby? This type of event is not off limits to those living in the city. Is it possible to make mirror contacts from one end of your city to the other? Tall buildings in the center of town may present a blockage or a challenge. Still others may have to follow the path of a river through town or climb a church steeple to send and receive a signal. The possibilities are endless. The contact with youth—rewarding. Contact your local scout troop to see if they are participating in the event next year or check out the On Target web page at <http://www.ontargetbsa.org>.

ARRL Signs Pact with REACT

After 20 years of discussions, representatives of the ARRL and REACT signed a memorandum of understanding (MOU) to promote joint resource coordination to facilitate the flow of information to and from the public during emergency situations.

ARRL President Jim Haynie, W5JBP, said "this memorandum of understanding is part of our efforts to establish a common front in dealing with emergencies and disaster communication and with other issues facing the radio hobby,



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Scouts build mirrors to flash a signal in the "On Target" event. Hams provide the radio links from many locations. (Courtesy On-Target website)

including such things as antenna ordinances." REACT International President Chuck Thompson, N5IAG, said the memorandum will strengthen the organizations' "common goal of providing assistance to the public." Thompson and Haynie are long-time friends, and Haynie is a member of REACT in the Dallas area. Haynie was the instructor for Thompson's Novice amateur radio license class. He says Thompson recruited him into REACT membership.

In recent years REACT has expanded its focus beyond its origins in the Citizens Band to embrace amateur radio and other services. ARRL and REACT share common goals in terms of emergency communication. The primary mission of REACT is "to provide public-safety communications to individuals, organizations, and government agencies to save lives, prevent injuries, and give assistance wherever and whenever needed."

According to the MOU, REACT coordinates efforts with other emergency organizations including the police, FEMA, NOAA, RACES, ARES, NVOAD, the Salvation Army, and the American Red Cross. REACT's other activities include participation in safety radio assistance for community events, hosting "Safety Wake Breaks" along highways on holiday weekends, and developing the use of radio services as additional sources of communications in emergencies.

In the agreement, REACT recognizes the ARRL as "a noncommercial membership association of radio amateurs, organized for the promotion of interest in amateur radio communication and experimentation. It is the principal representative of the Amateur Service and Amateur Satellite Services in the United States, and is the Secretariat for the International Amateur Radio Union, the worldwide association of national amateur radio societies. The ARRL coordinates efforts with other emergency organizations including the police, FEMA, NOAA, RACES, ARES, NVOAD, the Salvation Army, and the American Red Cross." It was interesting to note the wording of the agreement that "ARRL coordinates efforts with other emergency organizations including ... ARES." This is interesting since the ARRL *sponsors* ARES (the Amateur Radio Emergency Service) and ARRL leadership officials (Section Managers and Section Emergency Coordinators, along with a National Emergency Coordinator in Newington) coordinate the program. It's good to know that the ARRL cooperates with itself ... at least on paper.

The memorandum of understanding calls on the two organizations to "cooperate and utilize their resources from time to time to optimum mutual benefit to both parties." Among specific principles, the agreement will involve cooperation during emergencies and disaster relief and the elimination of what is termed "duplicative or technically inferior service" during such responses. The agreement continues, "The parties will generally encourage ongoing liaison with each other and urge members of both organizations to develop increasingly effective communications and cooperation."

Amateur reaction to the MOU is mixed across the country. Areas that have a good working relationship between hams and CB/GMRS operators generally support the MOU. Others are either opposed or have taken a wait-and-see attitude.

With Thanks...

This month we've taken a look at amateurs working with scouts and providing a service via the MARS program. We've also looked at one of the latest documents to influence volunteer public-service communications. We want to thank James Banks and Jim Sutton of Army MARS,the ARRL, and the scouts for supplying information for this column.

Do you have a story to tell? Drop me a note. Until next time...

73, Bob, WA3PZO

REACT President Chuck Thompson, N5IAG (left), and ARRL President Jim Haynie, W5JBP, are shown here signing a Memorandum of Understanding between the two organizations. (Photo courtesy Lee W. Besing, N5NTG, Secretary, REACT International)

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What's New

BY KARL T. THURBER, JR., W8FX

A New Column for A New Century

Hot Gear for a Hot Summer

This month in your "What's New" column we'll focus on some hot new radio gear and hamshack accessories we think will be of real interest to you. Let's begin the column by looking at a pair of top-notch VHF and UHF transceivers that recently hit the radio store shelves.

Radio Gear

Alinco DR-235 and DR-435 Transceivers. Alinco USA has announced two new models in its extensive amateur product line, the DR-235 (222 MHz) and the DR-435 (440 MHz) FM mobile/base transceivers. The new units are similar in style and function to the DR-135, which means they also have the ability to operate with Alinco's optional internal packet boards.

Each of the new transceivers has a large, seven-character alphanumeric display; 100 memory channels; ignition key on/off feature; theft alarm; CTCSS and DCS encode/decode capability; and DTMF encode functions. Ten auto-

*289 Poplar Drive, Millbrook, AL 35054-1674
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The LNK series of preamps are replacements for the popular LNG series low-cost preamps designed for use either by the receiver or at the antenna. The LNK series uses new low-noise MosFETs which are specifically optimized for best performance at VHF and UHF frequencies. Models are available for all popular bands from 28 MHz to 470 MHz. The Model LNK-450 receiver preamp is shown in this photo. (Photocourtesy Hamtronics)

dial memories are available, along with scan modes and extended receive capabilities. You can order the new units in either traditional black or classic pewter color schemes to blend your gear with newer car interiors.

The DR-235 features (see photo A) include 25/10/5 watt power output settings, extended receive from about 216–280 MHz, transmit capability from 222–225 MHz, and the ability to operate on MARS and other special frequencies. The memory channels can operate in any split-frequency configuration, with transmission limited to the ham frequency allocation. The DR-435 operates from about 430–450 MHz, with extended receive from 350–511 MHz. It has 35/10/5 watt output settings and the ability to operate odd repeater splits on any memory channel (transmit is limited to 430–450 MHz, however).

Just as the Dayton Hamvention was taking place in May, the following announcement was made. Alinco Electronics has closed its California office and shifted its US business operations to an independent distributor in Ohio. Effective May 3, 2001, Alinco said in a news release, customer service and distribution to dealers will be handled by Atoc Amateur Distributing of Covington, Ohio. All warranties will remain in force and will be honored for their full terms, according to the announcement. Alinco's US manager, Katsumi Nakata, said the company would be concentrating on designing and manufacturing new products while Atoc services Alinco's dealers and customers.

For more information and pricing, contact ATOC Amateur Distributing LLC, 23 S. High St., Covington, OH 45318 (telephone 937-473-2840; web: <http://www.alinco.com>). Detailed product information and instruction manuals for most Alinco gear are available online at their website, where you also can have a newsletter e-mailed to you to keep up to date on their products.

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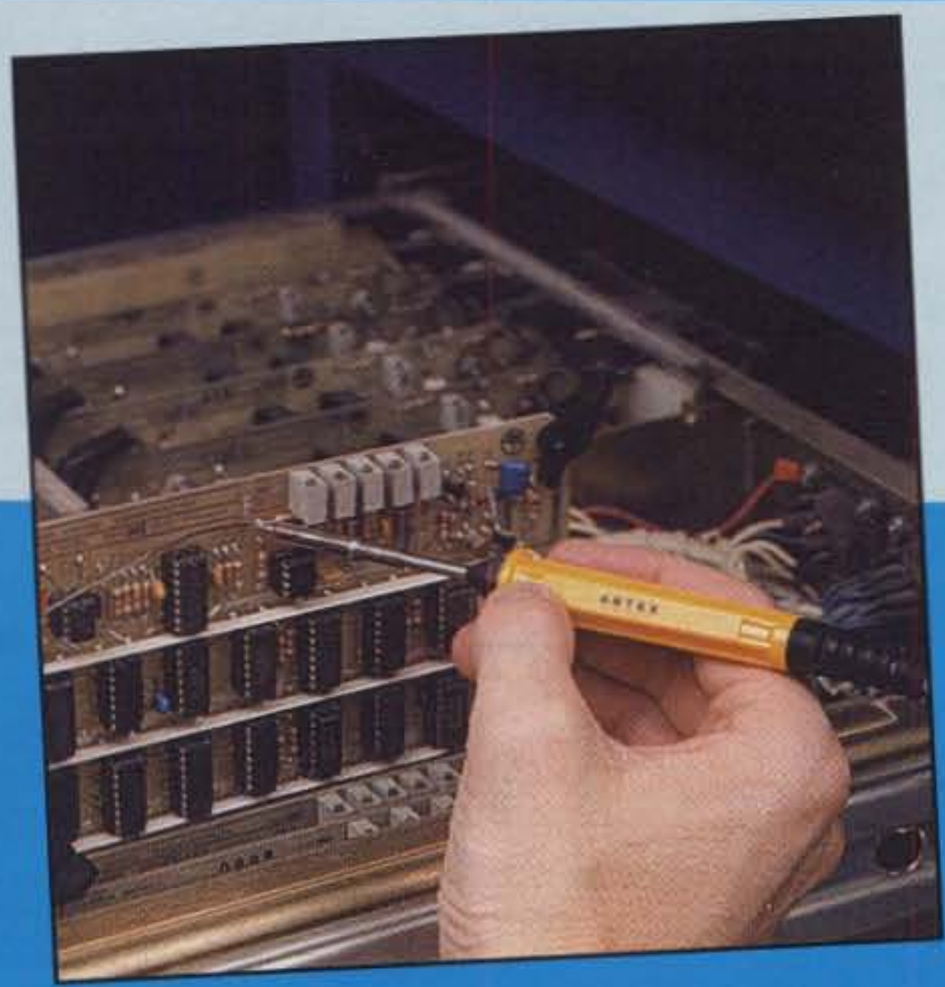
Alinco USA has announced two new models in its extensive amateur product line, the DR-235 (222 MHz) and the DR-435 (440 MHz) FM mobile/base transceivers. The DR-235, shown here, features 25/10/5 watt power output settings, extended receive from about 216-280 MHz, transmit capability from 222-225 MHz, and the ability to operate on MARS and other special frequencies. (Photo courtesy Alinco USA)

eration has better performance and is easier to use.

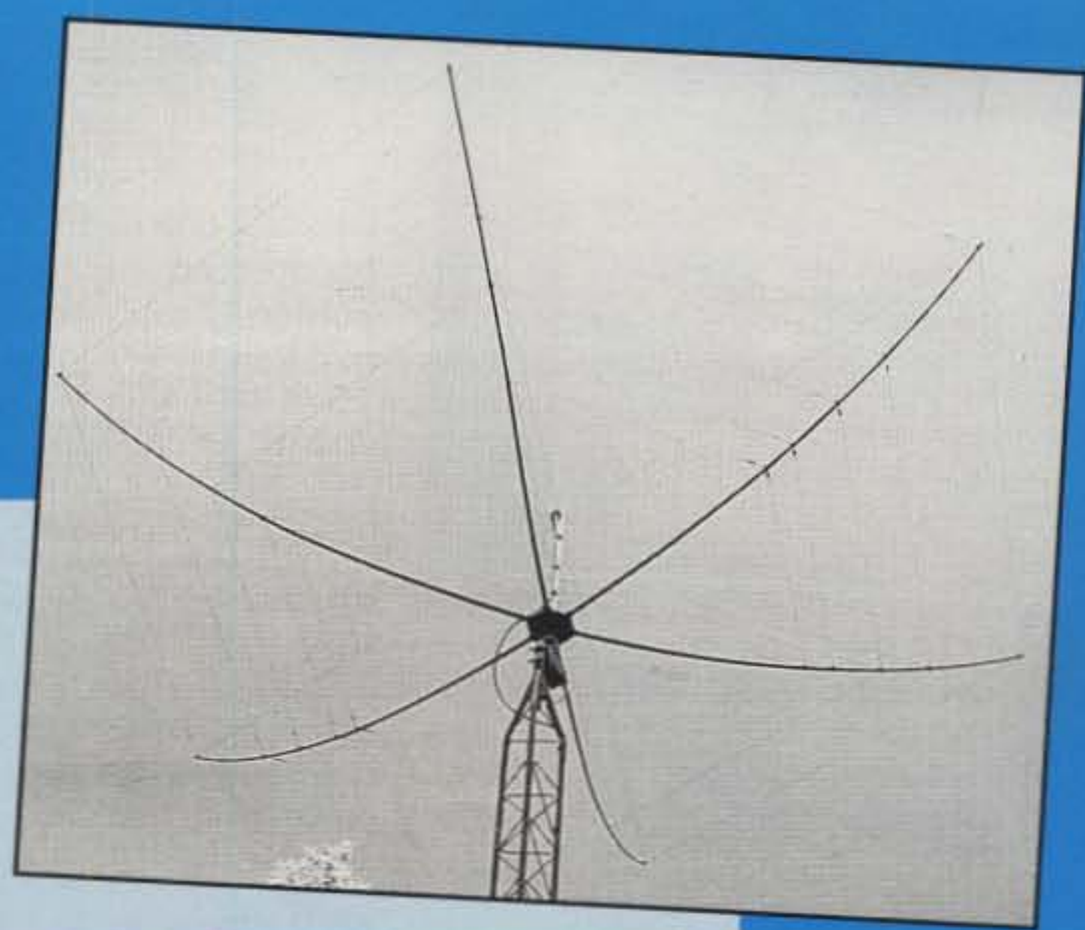
The highly capable, inexpensive LNK series of receiver preamps (photo B) are replacements for the popular LNG series, low-cost preamps designed for use either by the receiver or at the antenna. The LNK series uses new low-noise MosFETs which are specifically optimized for best performance at VHF and UHF frequencies. The FETs have built-in diode protection and very low feedback capacitance. This results in good stability and rugged performance under a wide range of voltage, signal, and load-impedance conditions. Surface-mount technology is used to obtain minimum noise figure and best stability, but the design allows for easy repairs should they be necessary.

LNK series models are available for all popular bands from 28 MHz to 470 MHz. Gain ranges from 18 to 26 dB, and noise figure ranges from 0.6 to 0.8 dB, depending on frequency range. Pricing is a modest $59 for a factory wired and tested unit.

Contact Hamtronics, Inc., 65-F Moul Rd., Hilton, NY 14468-9535 (716-392-



A precision miniature soldering iron that heats up and cools down quickly is available from M. M. Newman Corporation. The Antex Model M/3U Miniature Soldering Iron heats up to 650° F in under 45 seconds, and it cools within two minutes—ideal for repairing heat-sensitive components. The iron is only 8 inches long overall. (Photo courtesy M. M. Newman Corporation)



Traffie's top-of-the-line HX-5B Hex-Beam is a high-performance, multiband antenna for fixed-station applications. It covers the 20, 17, 15, 12, and 10 meter bands, has a 9.5 ft. turning radius, and weighs only 20 lbs. Here's a typical tower-mounted HX-5B installation at the QTH of K8AC. (Photo courtesy K8AC)

9430; e-mail: <jv@hamtronics.com>; web: <http://www.hamtronics.com>).

Antex Model M/3U Miniature Soldering Iron. A precision miniature soldering iron that heats up and cools down fast, making it ideal for field use with heat-sensitive components, now is available from M. M. Newman Corporation, distributor for Antex products.

The Antex Model M/3U Miniature Soldering Iron (photo C) heats up to 65o°F in under 45 seconds, and it cools within two minutes, making it ideal for repairing heat-sensitive components. Well-suited for field use, this compact soldering iron is only 8 inches long overall. It has a plastic handle that remains cool because the heating element is under the tip.

Putting heat directly into the tip (and not into the environment) for optimal thermal efficiency, the miniature iron has a three-wire grounded cord and operates on 115 VAC. Over 35 long-life, iron-plated, slide-on tips are offered, including shapes such as chisels, cones, spades, and pyramids. The Antex Model M/3U Miniature Soldering Iron is priced at $23.18, and tips typically cost $4.25 each. Literature is available upon request.

For more information, contact M. M. Newman Corporation, 24 Tioga Way, P.O. Box 615, Marblehead, MA 01945 (phone 1-800-777-6309; e-mail: <mmn@mmnewman.com>; web: <www.mmnewman.com>).

Antennas and Accessories

New from Traffie Technology. The popular Hex-Beam line of small, low-cost, quickly assembled but high-performance beams now is available with a number of design improvements. These improvements include UV-resistant Phillystran lines, heavy-duty machine ferrules for the two-piece fiberglass arms, and an improved center support with Teflon insulation at its feedpoint.

Hex-Beams are supplied "ARF"—that is, "almost ready to fly." What this means is that the hard work is already done. Only final assembly is required, and tuning or tweaking is not normally necessary.

Traffie's newly-improved, top-of-the-line HX-5B is a multiband antenna primarily intended for fixed-station operation (photos D and E). It covers the 20, 17, 15, 12, and 10 meter bands, has a 9.5 ft. turning radius, and weighs in at only 20 lbs. RF power-handling capability is 1500 watts. It's $749 plus applicable shipping/handling.

New for 2001 is the HDX-30 mast, a quickly-erected, 30 ft. telescoping aluminum mast especially designed for the HX-5B. Its locking sections make rotation possible by hand or with a ground-mounted rotor. It's UPS shippable, weighs about 18 lbs., and costs $329 plus s/h.

According to proprietor Mike Traffie, N1HXA, the HX-5B/HDX30 combination provides an excellent, compact, high-performance antenna system for almost anyone, anywhere. Its low wind loading and modest height requirement are especially important in seemingly "impossible" antenna installations.

For more information on the complete range of products offered or for package pricing, contact Traffie Technology, 421 Jones Hill Road, Ashby, MA 01431-1801 (1-888-599-2326; web: <http://www.hexbeam.com>).

Portable and Mobile Goodies

New from Kanga US. Bill Kelsey, N8ET, proprietor of Kanga US, has a slew of new QRP-related product infor-

Here's another photo of the improved HX-5B Hex-Beam. This one's a night shot taken at the 2000 Boxboro, Massachusetts Hamfest. The photo shows an HX-5B at 35 ft. on an Aluma aluminum tower. In this photo the Hex-Beam is easily turned by a TV rotator. (Photo courtesy Traffie Technology)

mation he'd like to share with our readers. Bill tells us that he now sells products from DK9SQ (Germany), Hands Electronics (Wales), Kanga Products (UK), and KK7B (US-designed kits), in addition to products of Bill's own design.

First, he says he has added the DK9SQ All Band Folded Vertical, tentatively priced at $59, to his line of DK9SQ imports. The new, 60 ft. long antenna covers all bands 80–10 meters, including the WARC bands. No antenna tuner is needed for any of the bands, although a good ground or radial system is required. As with all the DK9SQ products, the new vertical can be erected easily and quickly by one person. An accessory collapsible fiberglass mast is $99 plus s/h.

Bill also tells us that he's added the Hands Electronics RTX-109 All-Band SSB/CW Transceiver Kit to his line. The RTX-109 is an amateur band SSB/CW transceiver with a direct digital synthesis VFO that offers 1 Hz resolution. The RTX-109 is available as a QRP rig with watts output for $538, or as a medium-power rig with up to 20 watts output for $598. Construction is in modular form, allowing the budget-minded builder to start with a basic receiver and build up to the full transceiver.

Finally, Bill says he's added the KK7B R2Pro Receiver Module Kit to his extensive line of KK7B modules which are building blocks for a wide range of rigs. While most Kanga US products are for the QRP market, the KK7B kits (and some of the Hands kits) are aimed at VHF/UHF experimenters. The high-performance single-signal, phasing-type R2Pro kit was originally published in 1992. However, advances in components and techniques have led to significant improvements found in the R2Pro Receiver Module Kit.

For more information, contact Kanga US, 3521 Spring Lake Drive, Findlay, OH 45840 (419-423-4604; e-mail: <kanga@bright.net>;. web: <http://www.bright.net/~kanga/kanga>).

Garmin® eMap Deluxe GPS. Okay, do you really know just where you are at all times? The new, compact, handheld Garmin eMap Deluxe GPS (photo F) can reassure you with precisely this information. The 12-channel GPS offers detailed mapping capability, featuring simple, one-handed operation, plus a built-in basemap for North America. Additional highly detailed map data may be uploaded to the unit from optional MapSource™ CD-ROMs.

The eMap can display street-level detail, including addresses and business listings. Other features include a backlit display and 14-hour battery life. The water-resistant GPS includes a PC interface cable, manual, and 8 MB datacard. An optional 16 MB datacard for greater map storage also is available.

For more details and pricing, contact Jensen Tools, Inc., 7815 S. 46th St., Phoenix, AZ 85044-5399 (1-800-426-1194;. e-mail: <Jensen@stanleyworks.com>; web: <http://www.jensentools.com>).

Software and Computers

Buckmaster HamCall™ CD-ROM. In previous columns we profiled the very capable Buckmaster HamCall™ CD-ROM. It's now available "fresh every month," which means that whatever time of year you buy one of the CD-ROMs, it contains all the latest listings to that point. The CD lets you look up well over 1.6 million callsigns worldwide which are constantly updated with FCC and international data.

The easy-to-use, menu-driven product displays a wide variety of data, including callsign, class, name, address, license issue date, license expiration date, birthdate (over 666,000 U.S. birthdates are still in the database), previous call(s), previous class, grid square, county, time zone, area code, e-mail address (over 122,000 are provided), QSL manager, and web page.

You can search by callsign, class, name, street address, city, state, postal code, county, and country. HamCall prints standard, one-up labels for QSL cards, or prints all information for each ham. Label size, margins, columns, and rows are fully configurable. HamCall is supported by many logging programs.

A single CD is $50 plus $5 s/h. If you would like to receive more than one HamCall CD per year, you can obtain special pricing and shipping. As a nice

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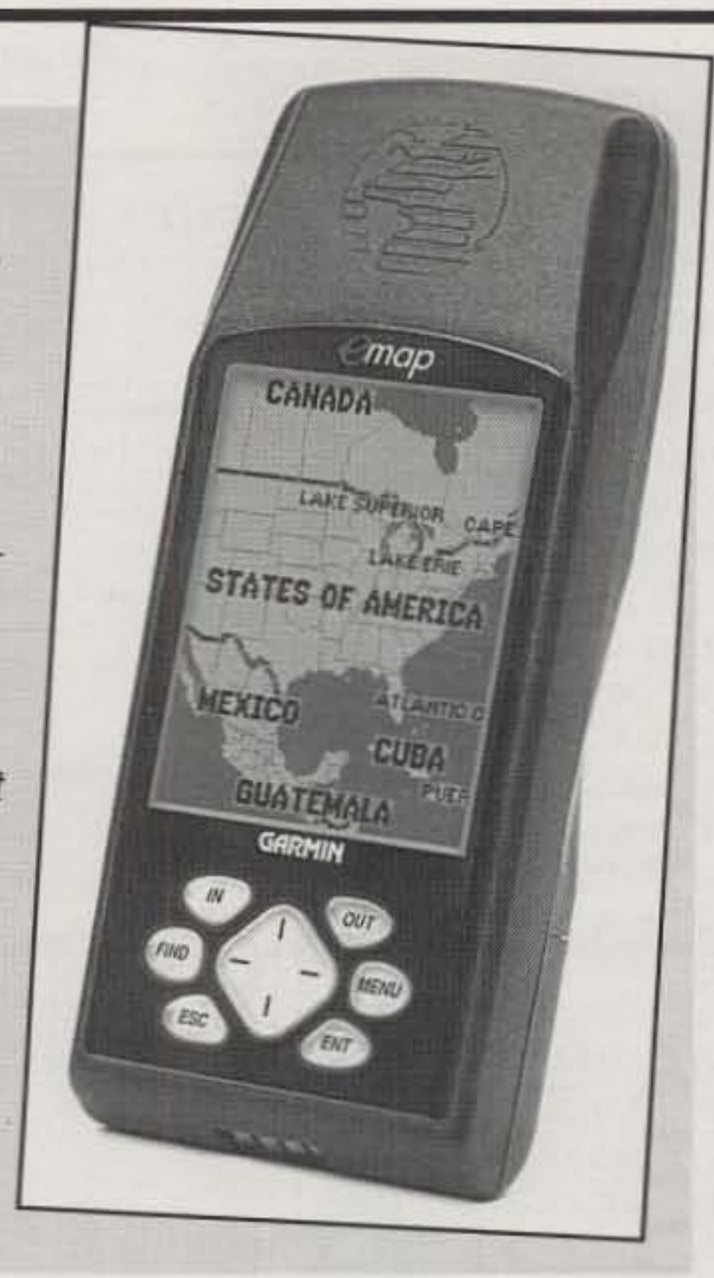

The Garmin® eMap Deluxe GPS from Jensen Tools can tell you just where you are at practically any time. The 12-channel GPS offers detailed mapping capability, featuring simple, one-handed operation, plus a built-in basemap for North America. Other features include a backlit display and 14-hour battery life. (Photo courtesy Jensen Tools, Inc.)

bonus, each purchase and prepaid subscription includes the user name and password to access extra online database search features of Buckmaster's Internet Search Service and the HamCall Notification Service (so you can be notified when not-found callsigns are subsequently found).

For more information, contact Buckmaster Publishing, 6196 Jefferson Highway, Mineral, VA 23117 (1-800-282-5628; e-mail: <info@buck.com>; web: <http://www.buck.com>).

From the Bookshelf

Telecom & Networking Glossary. Boasting that it represents "help for the technically challenged," Aegis Publishing Group has announced the second edition of Robert Mastin's popular *Telecom & Networking Glossary*. This comprehensive glossary tackles the complex terminology of the telecommunications industry with some of the most lucid, easy-to-understand explanations that you're likely to find in print.

Despite its name, the glossary isn't targeted at engineers and technicians. Rather, it's a desktop companion for non-technical persons—people who need to understand the basics without getting bogged down in technical detail. Written in a friendly, nonthreatening style, the glossary focuses on those terms that are seen most frequently in the trade press. Emphasis is given to fundamental concepts, business terms, and widely adopted technologies. More narrowly focused technical terms are given briefer treatment. The 245-page book is $14.95 and is available in bookstores or directly from the publisher.

For more information, contact Aegis Publishing Group, Ltd., 796 Aquidneck Avenue, Newport, RI 02842-7246 (phone 1-800-828-6961; e-mail: <aegis @aegisbooks.com>; web: <http://www. aegisbooks.com>). *Note:* A very useful online, searchable version is available at the Aegis Publishing website.

Short Bursts

Array Solutions Acquires Marketing Rights to RF Applications Product Lines. We've covered both firms' high-quality products in several columns. Now we'd like to pass along word of some major marketing changes that are in the works to bring several products better exposure in the marketplace. This update comes to us from RF Applications, Inc. President Bruce Knox, W8GN, and Array Solutions, Inc. President Jay Terleski, WXØB.

What's new is that Array Solutions has acquired the exclusive marketing rights to RF Applications, Inc.'s VFD, P3000, and P-5000 wattmeters and the RF Applications IBS-1 Intelligent Band Switch. Despite these changes, RF Applications will continue to manufacture and support these products from its Mentor, Ohio facilities and will honor all existing warranties. Separately, RF Applications also announced that it would no longer manufacture its P-2000A, P-5000A, and P-2000CW wattmeters. However, the new WinWatt series of RF wattmeters still will be manufactured and sold exclusively by RF Applications.

For more information, contact RF Applications, Inc., 7345 Production Drive, Mentor, OH 44060 (1-800-423-7252; e-mail: <sales@rfapps.com>;. web: <http://www.rfapps.com>). Also contact Array Solutions, 350 Gloria Rd., Sunnyvale, TX 75182 (972-203-2008; e-mail: <wx0b@arraysolutions.com>; web: <http://www.arraysolutions.com>).

Wrap-Up

That's all for this time, gang. Next time more "What's New." See you then.

Overheard: Funny thing, but have you noticed that just about every single world-changing invention was at first considered to be completely impossible?

73, Karl, W8FX

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Beginner's Corner

BY PETER O'DELL, WB2D

For the Newcomer to Ham Radio

Logging

True or false: The FCC requires you to keep a detailed log? If you are an old-timer like me, you probably would tend to answer "true." However, if you are a relative newcomer, then most likely you know that the answer is "false." You can't chalk this disparity up to the onset of Alzheimer's Disease!

The FCC rules once required hams to log every transmission. Now the closest thing to logging mentioned in the rules are some vague references to "station records." My, how things certainly have changed!

Back in the early 1970s I was living in Ann Arbor, Michigan. One of the local hams was extremely active on 2 meter FM, which was just taking off. Most of the equipment for 2 meter FM in those days was surplus two-way commercial units converted over to ham frequencies. My friend had a Motorola HT-200, which put him in the "elite" category. He spent the whole day at a hamfest talking to anyone and everyone. What better way to strike "equipment envy" into the hearts of your friends?! On the following Wednesday he received a letter from the Detroit FCC office demanding to see his log for the entire day of the hamfest. Oops.

Fortunately for my friend, he had been talking through a repeater instead of simplex, and the repeater had an audio tape of all activity. Thus, he spent several evenings constructing a log from that tape and got himself off the hook that way. However, that tale struck terror into the hearts of all of us moving into 2 meter FM, particularly any form of mobile operating.

On June 9, 1983, logging requirements were deleted from the FCC rules, but the terror of those earlier days has stayed with a number of us old buzzards. If some old codger starts ranting and raving about the need to keep a log, just humor him. He probably had some experience with the FCC similar to the one above.

For almost a decade I drove around with a miniature log book for 2 meter FM in my car, and I had another one for the base station. Then there was the "real" log book for HF. Certainly, I cannot think of a reason why any ham would bother logging every contact on FM these days. Talk about compulsive-obsessive. You might want to keep a general log of changes you have made to equipment and antennas, though. I've found that information to be invaluable at times.

Why would you bother logging any contacts at all these days? There are several good reasons to log certain kinds of contacts. Here are the ones I think are important to log: any exotic mode, HF SSB/CW, VHF/UHF weak signal, and any contact in which there might be some gray area of the rules. Also, I would log any contact where the operating power goes above a certain limit—say 50 watts or so.

Here is why I think it is important to log these types of contacts: If you are doing moonbounce or some other exotic mode, then you want the record. Not logging it would be akin to a research lab not keeping any records of its experiments. There is also the issue of awards. Even if you are not interested now, you might be later, or you might develop some "personal program" later on. For instance, a friend of mine confided in me recently that he has a personal goal of keeping his 6 meter country total higher than his chronological age. He is an old buzzard like me. That may sound like a strange goal, but not to me. Wait until you get to be our age! By the way, this argument holds true for HF operation, too. You may not be interested in awards and such things now, but that could change as you "mature" into the hobby.

Even if you are not into awards and QSLs and such, the hams you work may be. Do you remember every contact you made eight months ago? I don't. If I get a QSL card from some ham asking me to confirm our contact from some time back, what am I going to do without a log? It is not all that unusual for QSL

DATE	STARTING TIME	STATION CALLED	CALLED BY	HIS SIGNAL RST	MY SIGNAL RST	FREQ. (MHz)	EMISSION TYPE	POWER INPUT	ENDING TIME	REMARKS	QSLs SENT	QSLs RCVD

Fig. 1– This is a page from a log book that Yaesu handed out as a promotional item a few years back. The book includes a countries list, which can be really helpful to the new operator, plus a Prefix Allocation Table, good for figuring out where those non-standard prefixes are located. →

*123 NW 13th Street, Suite 313, Boca Raton, FL 33432
e-mail: <wb2d@cq-amateur-radio.com>

Feedback

Dean Hagerty, NR9P, writes, "Good article on grounding in the latest *CQ;* should help a lot of hams. I would offer a couple of comments. You mention not to solder any of the ground connections. This is true, but the use of Cadweld, a exothermic method of physically welding the copper ground wire to the copper-clad ground rod, results in a completely fused unit. This is much better than any mechanical connection, as mechanicals can come loose due to normal environmental thermal cycling, and will not melt like a solder connection. Cadweld can be purchased at commercial electrical supply firms.

"In addition I suggest the use of galvanized and copper-clad ground rods in the same installation could set up galvanic currents due to the dissimilar metals. This will result in a degraded ground system, possible sources of noise, and depletion of one of the ground rods."

From Edward F. Koloski, K2EFK: "I just read the article on grounding in June 2001 *CQ.* Not bad, but you should mention that the National Electrical Code has a section on antenna grounding and amateur radio. Also there is the possibility of ground loops when installing the station equipment as in the diagram on page 84; the coax also connects ground from one piece of equipment to another. I hope amateurs pay attention to your article. It could save their life as well as the equipment."

cards to come in the mail a couple of years after the contact. This line of reasoning holds true for VHF/UHF weak-signal operation as well.

The gray areas have to do with things such as third-party traffic—sending a message for someone else or letting someone else speak over your radio. If you should ever be blessed with a letter from the FCC asking for more information, having a log will definitely make it easier to give them whatever they are asking for. The idea behind logging for higher power operation is simple. The higher the power, the more likely you or a neighbor will experience some form of interference. Records in these cases always help in finding a solution.

What contacts would I not (read *don't*) log? I almost never log an FM contact. Nor do I log any packet activity, either. On the other hand, if I were to make a voice or packet contact with the International Space Station, I suspect that it would end up in my log.

Now you've decided to start keeping a log on a selective basis. How best to do it? A pad of paper and a few sharp pencils will do the job very nicely, or you can go the commercial route. The ARRL sells an 8½" × 11" spiral-bound log book that works very well. Each page has a grid of columns and rows for all the critical information. There is also room for comments about the contact. Because it is spiral bound, it lies flat when opened. They also have a "mini" version of the log book that some mobile operators may find more useful. You also can make up your own log sheets on your computer and photocopy them. If you are using log sheets instead of a bound book, you will want some means or keeping them organized and stored. A three-ring notebook is inexpensive and will do just fine.

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THE RADIO CLUB OF JUNIOR HIGH SCHOOL 22
P.O. Box 1052
New York, NY 10002

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What kind of information should you keep in your log? If you expect to get a QSL card, you should be accurate in writing down your QSO information. What kind of information do you need to write down during (or immediately after) the QSO? You need the DX's call, time, date, signal report, mode, and frequency/band. Also, you will want to know if you have sent or received a QSL card. Some log books include a list of DXCC countries and their prefixes. This is a handy feature, particularly for the less-experienced DXer.

One thing that should be pointed out is this: The U.S. is out of step with the rest of the world in terms of standardized forms of writing the date. Typically, we write the date as MONTH/DAY/YEAR. Most foreign hams write the date as: DAY/MONTH/YEAR. If today's date is 01/AUG/01, how are we going to write it out? It may be okay to abbreviate the month if you are dealing with another English-speaking country, but will a Japanese-speaking operator recognize "AUG" as the eighth month of the year? How about an operator from Mongolia? You don't want to let that one slip by because the person at the other end doesn't know what "AUG" means!

You don't want to use a format something like 03/06/01. Is that March 6 or June 3? The commonly accepted way around this is to use Arabic numerals (regular numbers) for the day and year. However, use Roman numerals for the month.Thus, our example above would be 03/VI/01 for June 3 or 06/III/01 for March 6. With this system there is little or no chance of another operator misinterpreting the date. It is a good habit to cultivate.

Logging Programs

Logging is area where computers can be a godsend. This can be done real time (as the contact is happening) or after the fact. A good logging program does a lot more than simply list the contact information in sequential order. No, a good logging program is a record keeper, an organizer, and much, much more. Some of today's "logging" programs even control your rig and move one of your VFOs to the DX's frequency when a spot is posted on the internet or a packet cluster.

How many countries do you have on 10 meters? Which are confirmed, and which are worked but no QSL yet? How about your progress toward WAZ? What is your overall country count? CW only? SSB only? Do I need the TRØ that just showed up on 10? A good logging program will tell you that and more with just a couple of keystrokes.

There are numerous logging programs out there, with more showing up regularly. How do you find out about them and decide which one meets your needs? Of course, you can check the ads in *CQ*. Most of the ads list a web address, so you can get almost instant access to information. However, you can also log onto a general ham radio site such as K1DWU Dot Net <http://www.k1dwu.net/> and search for links to logging sites. At the main menu, click on "ham links." In that screen select the links to "software." The last time I looked at this site there were about 75 sites listed with half focusing on logging software.

Many companies offer a downloadable "trial" version which is often good for 30 days or, perhaps, has certain desirable features disabled. You can try out the program. If you like it, then you pay for it and get the full version. I think this is a much better approach than buying a program without a clear idea of how it will function in your station on a day-to-day basis.

All good programs offer some capability to import and export data files. This means you can transfer your data file to the next trial program without rekeying it, and that means the ability to upgrade to a better program later on, no matter how many contacts you have.

One thing to keep in mind is that you may want a logging program for contest operation different than the one you would use in a day-to-day hamming. Contest operation is highly simplified when you use a logging program dedicated to a particular contest. Again, the ability to import and export files is critical if you use a different program for these special events.

Logging is just good record keeping. A little time now can save you hours of wasted time later on. That's a good investment in any area of life!

73, Pete, WB2D

Call for Photos and Stories

We'd like to hear from you about your experiences as a newcomer. If you have questions, we'll try to incorporate them into future columns. If you have photos (color prints or slides okay) of your station or antennas, please send them along and we'll publish the best ones. If you have a solution to a common problem that new hams experience, we'd like to hear about it so we can pass it along. You can contact me at <wb2d@cq-amateur-radio.com> or Peter O'Dell, WB2D, Beginner's Corner, 123 NW 13th St., Suite 313, Boca Raton, FL 33432.

BY CARL SMITH, N4AA

News Of Communication Around The World

QSLing—Again!

Summer is well underway by now, at least here in the States. I trust those summertime antenna projects are off the drawing board and hopefully in the air by this time. Just a few months until the major contest season starts and, of course, you want to be sure everything is working before you get into the fray.

QSLing—Again!

I've been getting a number of comments about the long period of time between a DXpedition operation and when the QSL cards actually get into the hands of the Deserving. What is the reason for the delay of many months? Is there really a reason to be concerned about the length of time? I know. I asked two apparently opposing questions, didn't I? Well, there really are two questions to be asked and answered.

What is the reason for the delay? I've heard several different stories on this question. Some of the "big" DXpeditions have the cards donated by some group/organization. Usually this donor is not even in the same country as the DXpedition team leader(s). The cost of thousands of QSL cards could easily bankrupt all but the wealthiest DXpeditioners' budgets. Therefore, looking at it from their point of view, the donation of the cards is a substantial donation and one they won't have to fund.

Okay, they don't have to fund it, but why does it take this "donor" so long to come up with the cards? Well, now, that is a question to be answered by some of those donors. Perhaps some of them would like to share the answer with us. I'll be happy to tell their side of the story in these pages.

Let's look at the other question with which I started this section: Is there reason to be concerned about the delay? Well, not really. You old timers out there might remember when it took years to get those rare Russian countries confirmed by the only way to get them—Box 88, Moscow. Oh sure, it isn't that bad anymore, and we should have these cards in no more than a few weeks after the operation is over, right? *Wrong!!* It doesn't have to work that way, folks. Look at the calendar and check the dates of when your "new ones" have to be checked by the DXCC desk for them to show up in the next Yearbook. As long as you get them in by September 30th, they will count for the current year. I have confirmed with Bill Moore at the ARRL DXCC desk the September 30th date.

What have I said here? Perhaps nothing; perhaps a lot. I hope to generate some response from DXpeditioners with comments on the reasons for the delay. If I get any responses, I certainly will share them with you.

It would be nice if every DXpedition could have their QSL cards available immediately, such as the A52A operation which issued thousands of cards in a matter of days following the May 2000 operation. There have been other operations which answered requests in a very short time. G3SXW and G3TXF come to mind. They have been excellent in responding to requests in a very timely manner. There are still others, I'm sure, but the above two stand out when I think of QSLing. However, not every DXpedition can do this, for any number of reasons.

I look forward to hearing from DXpeditioners and DXers alike on this topic.

Speaking of QSL cards, look at this. Bert, PA3GIO, is shown with over 20,000 cards to reply to following his VK9CO and VK9XV DXpedition. (Photo courtesy John, KDØJL)

The 2000 Oceania DX Contest

By Brian Miller, ZL1AZE
2000 Oceania DX Contest Manager

Congratulations to all the winners in the 2000 Oceania DX Contest. Conditions were not great, but there were still plenty of high scores and happy hunters.

Oceania Phone Results

Martin Luther, VK5GN, was the winner of the Oceania Single Operator All Band Phone category and the first recipient of the new Ron Wills, ZL2TT Memorial Trophy. He scored 3.39M points, setting a new record for this category.

Top place in the Multi-Operator Multi-Band Phone category went to the Wellington Amateur Radio Club, which used their big antenna farm at ZL6QH to achieve 3.73M points. The other multi-op teams at VK4WIL and ZL3DXC were not far behind.

May Excell, VK5AM, put in an extraordinary effort to take top place in the 15 meter Single Operator Phone category with a score of 1.13M, another new record. The Single Operator 20 and 10 meter Phone categories were won by Christian Paun, VK3MS, and Denys Brosnan, ZL2AWH, respectively.

The winner and only entrant in the SWL Phone category was 15-year-old James O'Hare, ZL3501, who logged 1326 points, an excellent result considering this was his first contest.

Oceania CW Results

John Loftus, VK4EMM, was the winner of the Oceania Single Operator All Band CW category. He scored 2.33M and receives the Frank Hine, VK2QL Memorial Trophy for his superb efforts.

Top place in the Multi-Operator Multi-band CW category went to ZL6QH, who racked up a huge 4.84M points (although that was still less than their record score of 6.86M in 1999).

The Single Operator 40, 15, and 10 meter categories were won by Mike Dorman, W7DRA/KH6, Eduardo Salcedo, DU1ODX, and Denys Brosnan, ZL2AWH, respectively.

Non-Oceania Results

Special congratulations to Ken Keeler, N6RO, who logged an awesome 24.4K points in the CW Single Operator All Band category, the highest score in North America and worldwide. Several Oceania stations were thrilled to work Ken on five bands.

Another significant effort was from Igor Suckov, RZ4HF, who scored 18.0K

P.O. Box DX, Leicester, NC 28748-0249
e-mail: <n4aa@cq-amateur-radio.com>

The WPX Program

SSB

2803 ..... DS5ACV 2805 ..... W4GP
2804 ..... HL5BLF 2806 ..... IT9VCE

CW

3068 ..... KØKG 3070 ..... JR2IAC
3069 ..... PY1LVF

CW: 400 JR2IAC. 500 F5PBL. 850 WA2VQV. 900 W3BM. 1000 IK3GER. 2000 K9UQN. 3650 N4NO.

SSB: 350 IT9VCE. 450 JQ1CJF. 600 JA3WFQ. 650 AE5DX., PY1LVF. 700 W4GP. 1250 LU4DA. 2100 CT1EEN. 3150 N4NO.

MIXED: 650 JA3WFQ. 1150 W4GP. 1550 KØKG. 2050 CT1EEN. 2350 K9UQN. 4150 N4NO. 4850 W2FXA.

10 meters: CT1EEN, W3BM
15 meters: CT1EEN, PY1LVF, W3BM
20 meters: CT1EEN, F5PBL
40 meters: CT1EEN
80 meters: CT1EEN

Asia: CT1EEN
Africa: CT1EEN
N. America: CT1EEN
S. America: CT1EEN, W4GP, PY1LVF
Europe: CT1EEN, PY1LVF, W3BM
Oceania: CT1EEN

Award of Excellence Holders: K6JG, N4MM, W4CRW, K5UR, K2VV, VE3XN, DL1MD, DJ7CX, DL3RK, WB4SIJ, DL7AA, ON4QX, 9A2AA, OK3EA, OK1MP, N4NO, ZL3GQ, W4BQY, IØJX, WA1JMP KØJN, W4VQ, KF2O, W8CNL, W1JR, F9RM, W5UR, CT1FL, WA4QMQ, W8ILC, VE7DP, K9BG, W1CU, G4BUE, N3ED, LU3YL/W4, NN4Q, KA3A, VE7WJ, VE7IG, N2AC, W9NUF, N4NX, SMØDJZ, DK5AD, WD9IIC, W3ARK, LA7JO, VK4SS, I8YRK, SMØAJU, N5TV, W6OUL, WB8ZRL, WA8YM, SM6DHU, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, DK4SY, UR2QD, ABØP, FM5WD, I2DMK, SM6CST, VE1NG, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, HA8XX, K7LJ, SM3EVR, K2SHZ, UP1BZZ, EA7OH, K2POF, DJ4XA, IT9TQH, K2POA, N6JV, W2HG, ONL-4003, W5AWT, KBØG, HB9CSA, F6BVB, YU7SF, DF1SD, K7CU, I1PO, K9LNJ, YB0TK, K9QFR, 9A2NA, W4UW, NXØI, WB4RUA, I6DQE, I1EEW, I8RFD, I3CRW, VE3MC, NE4F, KC8PG, F1HWB, ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, KC7EM, YU1AB, IK2ILH, DEØDAQ, I1WXY, LU1DOW, N1IR, IV4GME, VE9RJ, WX3N, HB9AUT, KC6X, N6IBP, W5ODD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, WØULU, K9XR, JAØSU, I5ZJK, I2EOW, IK2MRZ, KS4S, KA1CLV, KZ1R, CT4UW, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, OE1EMN, W9IL, S53EO, DF7GK, I7PXV, S57J, EA8BM, DL1EY, KØDEQ, KUØA, DJ1YH, OE6CLD, VR2UW, 9A9R, UAØFZ, DJ3JSW, HB9BIN, N1KC, SM5DAC, RW9SG, WA3GNW, S51U, W4MS, I2EAY, RAØFU, CT4NH, EA7TV, W9IAL, LY3BA, K1NU, W1TE, UA3AP, EA5AT, OK1DWC, KX1A.

160 Meter Endorsement: K6JG, N4MM, W4CRW, K5UR, VE3XN, DL3RK, OK1MP, N4NO, W4BQY, W4VQ, KF2O, W8CNL, W1JR, W5UR, W8RSW, W8ILC, G4BUE, LU3YL/W4, NN4Q, VE7WJ, VE7IG, W9NUF N4NX, SMØDJZ, DK3AD, W3ARK, LA7JO, SMØAJU, N5TV, W6OUL, N4KE, I2UIY, I4EAT, VK9NS, DEØDXM, UR1QD, AB9O, FM5WD, SM6CST, I1JQJ, PY2DBU, HI8LC, KA5W, K3UA, K7LJ, SM3EVR, UP1BZZ, K2POF, IT9TQH, N8JV, ONL-4003, W5AWT, KBØG, F6BVB, YU7SF, DF1SD, K7CU, I1POR, YBØTK, K9QFR, W4UW, NXØI, WB4RUA, I1EEW ZP5JCY, KA5RNH, IV3PVD, CT1YH, ZS6EZ, YU1AB, IK4GME, WX3N, WBØDD, IØRIZ, I2MQP, F6HMJ, HB9DDZ, K9XR, JAØSU, I5ZJK, I2EOW, KS4S, KA5CLV, KØIFL, WT3W, IN3NJB, S50A, IK1GPG, AA6WJ, W3AP, S53EO, S57J, DL1EY, KØDEQ, DJ1YH, OE6CLE, HB9BIN, N1KC, SM5DAC, S51U, RAØFU, UAØFZ, CT4NH, W1CU, EA7TV, LY3BA, RW9SG, K1NU, W1TE, UA3AP, OK1DWC, KX1A.

Complete rules and application forms may be obtained by sending a business-size, self-addressed, stamped envelope (foreign stations send extra postage if airmail desired) to "CQ WPX Awards," P.O. Box 593, Clovis, NM 88101 USA. *NOTE: WPX will not accept prefixes/calls which have been confirmed by computer-generated electronic means.*

Robert, S53R, is shown operating CW at AP2ARS. He, along with Peter, ON6TT, is now working in this part of the world (Pakistan). Look for more activity from them from various locations. (Photo courtesy ON6TT)

to win the top Single Operator All Band Phone category in Europe. Vasily Romanyuk, ER4DX, was close behind with 17.0K points.

The full 2000 results (including band breakdowns for non-Oceania stations) will be published on the web at <www.nzart.org.nz/nzart/update/contests/contests.html>.

Logs

Approximately 50% of the 301 logs received were sent via e-mail. The remainder were paper logs (except for one log on diskette) via snail mail. All of the logs were checked for the required information and cross-checked against other logs. Approximately 29% had their score adjusted downward and another 13% were adjusted upward. Most of the upward adjustments were related to entrants adding up individual band scores rather than multiplying the total points

The CQ WW WPX CW Contest team at T48K. Left to right: CO8ZZ, CO8DM, and CO8JY. (Photo by Luis Garcia, courtesy DK1WI)

The WAZ Program

Single Band WAZ

10 Meter SSB

525 ..... SM3NRY

12 Meter SSB

23 ..... SM3NRY

15 Meter SSB

553 ..... SM3NRY 555 ..... DS4NPL
554 ..... PY5EG 556 ..... JA4ITW

17 Meter SSB

26 ..... SM3NRY

20 Meter SSB

1077 ..... SM3NRY

40 Meter SSB

96 ..... SM3NRY

10 Meter CW

165 ..... SM3NRY

12 Meter CW

24 ..... SM3NRY

15 Meter CW

289 ..... SM3NRY 290 ..... JA1HSF

17 Meter CW

31 ..... SM3NRY 32 ..... W7LGG

20 Meter CW

515 ..... SM3NRY 516 ..... W3BM

30 Meter CW

43 ..... SM3NRY

40 Meter CW

218 ..... SM3NRY

20 Meter RTTY

51 ..... SM3NRY

All Band WAZ

SSB

4662 ..... K7BTW 4666 ..... 6K5REL
4663 ..... HL5BLF 4667 ..... JH9DNK
4664 ..... HK4PZK 4668 ..... KO4XI
4665 ..... JR1DHD 4669 ..... JF2IGP

Mixed

8049 ..... UA9YE 8053 ..... N2PAQ
8050 ..... 9A3KR 8054 ..... WA9PIE
8051 ..... KØCA 8055 ..... DL3VXX
8052 ..... DL8WJG

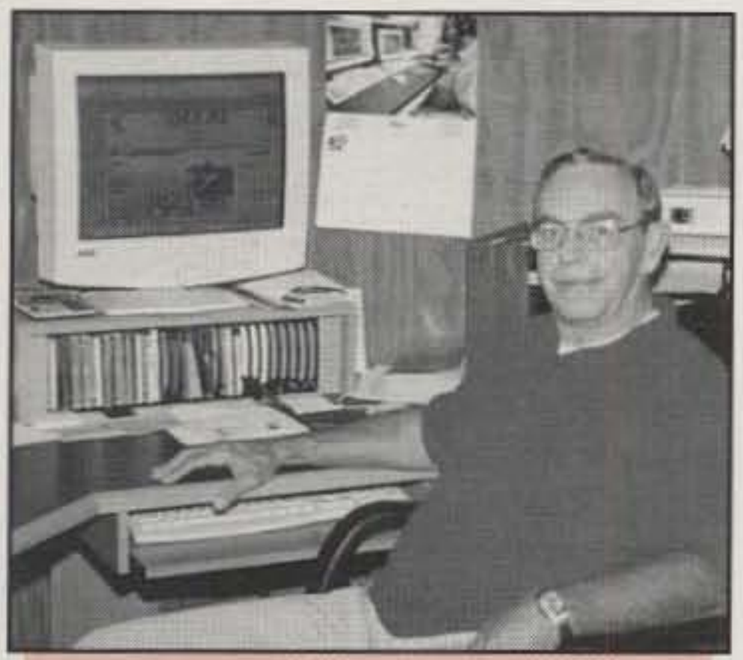
All CW

246 ..... W8PT 251 ..... PY1LVF
247 ..... K7BTW 252 ..... DL1SP
248 ..... RW3AX 253 ..... IKØMHR
249 ..... HB9ARF 254 ..... W3BG
250 ..... DL1JFM

RTTY

127 ..... SP3CUG 128 ..... DS5RNM

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for all *CQ* awards is $6.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $12.00 for nonsubscribers. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached via e-mail: <k5rt@cq-amateur-radio.com>.



Here's the editor of this column, Carl, N4AA, just for you folks who haven't met him! Note the CQ calendar on the wall. (Photo courtesy N4AA)

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- 600 watts.

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9140	40 meters	9112	12 meters
9130	30 meters	9110	10 meters
9120	20 meters	9106	6 meters
9117	17 meters		

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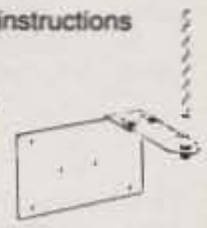

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5 Band WAZ

As of April 30, 2001, 562 stations have attained the 200 zone level and 1202 stations have attained the 150 zone level.

New recipients of 5 Band WAZ with all 200 zones confirmed: None

The top contenders for 5 Band WAZ (zones needed, 80 meters):

N4WW, 199 (26)
W4LI, 199 (26)
K7UR, 199 (34)
WØPGI, 199 (26)
W2YY, 199 (26)
VE7AHA, 199 (34)
IK8BQE, 199 (31)
JA2IVK, 199 (34 on 40m)
ABØP, 199 (23)
KL7Y, 199 (34)
NN7X, 199 (34)
IK1AOD, 199 (1)
DF3CB, 199 (1)
F6CPO, 199 (1)
KC7V, 199 (34)
GM3YOR, 199 (31)
VO1FB, 199 (19)
KZ4V, 199 (26)
W6DN, 199 (17)
W6SR, 199 (37)
W3NO, 199 (26)
K4UTE, 199 (18)
HB9DDZ, 199 (31)
RU3FM, 199 (1)
HB9BGV, 199 (31)
N3UN, 199 (18)
OH2VZ, 199 (31)
K2UU, 199 (26)
W1FZ, 199 (26)
UT4UZ, 199 (6)
SM7BIP, 199 (31)
K4ZW, 199 (23)
W9RPM, 199 (19)
PY5EG, 199 (23)
SP5DVP, 199 (31 on 40)
HC8N, 198 (36 on 80, 39 on 40)
EA5BCX, 198 (27,39)
G3KDB, 198 (1,12)
KG9N, 198 (18,22)
KØSR, 198 (22,23)
UA4PO, 198 (1,2)
JA1DM, 198 (2,40)
9A5I, 198 (1,16)
LA7FD, 198 (3,4)
K5PC, 198 (18,23)
VE3XO, 198 (23,23 on 40)
K4CN, 198 (23,26)
KF2O, 198 (24,26)
W6BCQ, 198 (37,34on40)
G3KMQ, 198 (1, 27)
W5BOS, 198 (18,23)
N2QT, 198 (23,24)
OK1DWC, 198 (6,31)
K7FL, 198 (23,37)

The following have qualified for the basic 5 Band WAZ Award:

K2JG (152 zones)
EW3CW (167 zones)
PY5EG (199 zones)
IK2QPR (165 zones)
UA9YE (190 zones)

Endorsements:
W5RQ (187 zones)
K6FG (194 zones)
SP5DVP (199 zones)
K7FL (198 zones)

****Please note: Cost of the 5 Band WAZ Plaque is $80 ($100 if airmail shipping is requested).**

Rules and applications for the WAZ program may be obtained by sending a large SAE with two units of postage or an address label and $1.00 to: WAZ Award Manager, Paul Blumhardt, K5RT, 2805 Toler Road, Rowlett, TX 75089. The processing fee for the 5BWAZ award is $10.00 for subscribers (please include your most recent *CQ* mailing label or a copy) and $15.00 for nonsubscribers. An endorsement fee of $2.00 for subscribers and $5.00 for nonsubscribers is charged for each additional 10 zones confirmed. Please make all checks payable to Paul Blumhardt. Applicants sending QSL cards to a *CQ* checkpoint or the Award Manager must include return postage. K5RT may also be reached at e-mail: <k5rt@cq-amateur-radio.com>.

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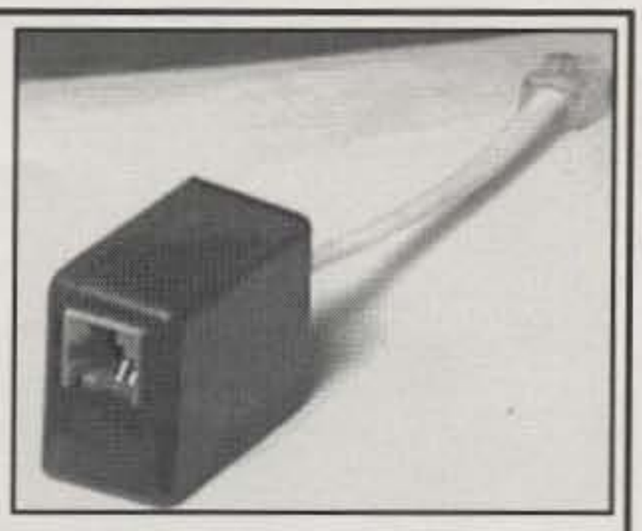

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CQ DX Awards Program

SSB Endorsements

320.....PY4OY/333
320.....N5ZM/332
320.....W8AXI/331
320.....YV1JV/331
320.....CT1EEN/329
320.....AE5DX/328
320.....W2FGY/327

CW Endorsements

320.....YU1HA/333
320.....WØJLC/331
320.....N4AH/329
320.....NØFW/326
300.....F5OIU/302
200.....K6UXO/208

The basic award fee for subscribers to *CQ* is $6. For nonsubscribers, it is $12. In order to qualify for the reduced subscriber rate, please enclose your latest *CQ* mailing label with your application. Endorsement stickers are $1.00 each plus SASE. Updates not involving the issuance of a sticker are free. Rules and application forms for the CQ DX Awards Program may be obtained by sending a business-size, No. 10, self-addressed, stamped envelope to CQ DX Awards Manager, Billy Williams, N4UF, Box 9673, Jacksonville, FL 32208 U.S.A. Currently we recognize 333 active countries. Please make all checks payable to the award manager.

by total multipliers to calculate the final score. Others were due to entrants not counting multipliers correctly—e.g., not realizing that each prefix can be counted once on each band. These issues will be clarified in the 2001 contest rules.

Overall participation from Oceania stations has been experiencing a downward trend for some time. A recent analysis by VK6NE shows that we have moved from around 100 Oceania entrants in the early 1970s to less than half that in 2000. The contest is in danger of dying if we do not reverse this trend.

The 2001 Contest

The 2001 Oceania DX contest will be held on 6/7 October (Phone) and 13/14 October (CW). This will mark 66 years since the contest first started in 1935. Let's have a big turnout in 2001 for

THE WPX HONOR ROLL

The WPX Honor Roll is based on the current confirmed prefixes which are submitted by separate application in strict conformance with the CQ Master Prefix list. Scores are based on the current prefix total, regardless of an operator's all-time count. Honor Roll must be updated annually by addition to, or confirmation of, present total. If no up-date, files will be made inactive.

MIXED

4922 9A2AA	3652 VE3XN	3118 W9HA	2903 KF2O	2743 HAØIT	2305 W8UMR	1877 OZ1ACB	1496 KØKG	1165 KX1A
4363 W2FXA	3624 9A2NA	3091 WA8YTM	2878 W2WC	2597 HA5NK	2256 K5UR	1842 I2EAY	1436 N1KC	1154 EA2BNU
4057 K6JG	3606 N4MM	3029 YU7BCD	2849 4N7ZZ	2469 YU7GMN	2170 W4UW	1745 AA1KS	1429 W2EZ	1147 W2CF
4034 W1CU	3573 N9AF	3027 YU7SF	2835 W2WC	2464 K2XF	2093 W7OM	1716 Z35M	1418 WT3W	1082 OK1DWC
4030 F2YT	3523 SM3EVR	3026 K9BG	2831 IT9QDS	2455 N6JM	2028 WB3DNA	1670 W7CB	1408 NG9L	1040 PY1NEW
3960 EA2IA	3513 I2PJA	3010 WB2YQH	2800 JH8BOE	2424 W98L	2019 HA9PP	1651 I1-21171	1337 VE6BMX	1020 KU6U
3846 N4NO	3465 K5JR	2964 I2MQP	2798 IK2ILH	2380 9A4W	2012 JN3SAC	1613 YU1ZD	1343 VE6FR	1006 K6UXO
3772 UA3FT	3458 YU1AB	2970 S53EO	2787 KØDEQ	2372 S58MU	1939 PY2DBU	1572 VE6BF	1295 VE9FX	937 N3KR
3762 N6JV	3144 PAØSNG	2945 I2EOW	2773 W2ME	2314 W6OUL	1916 DJ1YH			

SSB

4306 IØZV	2980 N4NO	2500 4X6DK	2033 HAØIT	1667 KS4S	1548 K8MDU	1318 N2SS	1138 VE9FX	783 VE6BMX
4065 VE1YX	2968 EA8AKN	2488 I8KCI	1975 K5UR	1655 K5IID	1545 SV3AQR	1311 KC6X	1092 N1KC	781 N3DRO
3845 ZL3NS	2900 N5JR	2412 WA8YTM	1972 W4UW	1643 W6OUL	1525 IKØEIM	1273 NG9L	1070 N3SAC	717 F5RRS
3758 K6JG	2888 I4CSP	2404 KF7RU	1870 LU5DV	1631 HA5NK	1514 W2ME	1239 LU4DA	1064 I2EAY	716 KX1A
3549 F6DZU	2877 9A2NA	2381 YU7BCD	1860 N6FX	1631 K3IXD	1493 IK2AEQ	1222 LU3HBO	1064 NH6T	699 KU6J
3503 I2PJA	2758 PAØSNG	2333 W2WC	1860 K2XF	1626 W7OM	1483 DF7HX	1192 K4CN	1051 EA3EQT	680 OK1DWC
3172 CT4NH	2739 I2MQP	2325 EA1JG	1748 YU7SF	1617 I3ZSX	1427 N3XX	1179 KI7AO	1005 DL8AAV	652 F5LIW
3168 N4MM	2706 I2EOW	2305 CX6BZ	1717 W9IL	1599 DK5WQ	1421 W2FKF	1165 EA5DCL	990 HA9PP	634 F5UTE
3056 EA2IA	2672 CT1AHU	2134 IN3QCI	1707 I8LEL	1591 IT9SVJ	1410 T30JH	1154 WT3W	972 AI6Z	609 VE7SMP
3019 OZ5EV	2515 LU8ESU	2038 OE2EGL	1698 EA7TV	1568 CT1BWW	1385 I3UBL	1141 IKØJMS	890 AG4W	605 KE4SCY
2995 F2VX	2515 EA5AT							

CW

4045 WA2HZR	2699 LZ1XL	2288 W2WC	1996 G4SSH	1762 W6OUL	1488 VE6BF	1268 4X6DK	1060 W4UW	832 WT3W
3734 N6JV	2589 N5JR	2238 JA9CWJ	1951 W2WC	1706 JN3SAC	1485 9A3SM	1257 EA2CIN	1034 WO3Z	750 KX1A
3399 N4NO	2566 9A2NA	2198 EA7AZA	1946 I7PXV	1672 IK3GER	1480 K5TSS	1248 AC5K	987 K6UXO	732 AI9L
3365 VE7CNE	2548 N4MM	2159 KA7T	1923 K2XF	1590 EA7AAW	1466 IK2ECP	1244 I2MQP	935 VE6BMX	732 N1KC
3319 K6JG	2534 W2ME	2105 G3VQO	1910 LU2YA	1572 W9IL	1393 EA6AA	1154 LU7EAR	926 PY4WS	668 KU6J
3043 K9QVB	2437 YU7BCD	2016 N6FX	1821 K5UR	1535 I2EAY	1339 LU3DSI	1150 DF6SW	898 JK1AJX	612 F5RRS
3021 YU7LS	2396 WA8YTM	2000 OZ5UR	1779 IT9VDQ	1546 W7OM	1310 I2EOW	1121 EA2BNU	836 WA2VQV	604 EA5DCL
3005 EA2IA								

Oceania's longest running and premier DX contest!

Finally, thank you to all the participants who made the 2000 contest a reality, and a special thanks to the team from the Wellington Amateur Radio Club (ZL2AOV, ZL2BSJ, ZL1AXG, ZL2BSW, ZL2AMI, and ZL2AOH), who sacrificed many summer evenings to help with the log-checking process.

In Closing . . .

I must thank Jeff Wolf, K6JW, for giving me the source of one of my quotes. In the May column I made reference to the saying "We have seen the enemy and it is us," commenting that I didn't know the source. Jeff tells me it first appeared in a "Pogo" comic strip and is attributed to Walt Kelly. Thanks, Jeff.

Until next month, have fun and work lots of DX.

73, Carl, N4AA

QSL INFORMATION

3B6RF to HB9AGH
3D2NV to JA1NVF
3W2LC to VK6LC
4O1W to YZ1AU
4W/N5KO to KU9C
4W/W3UR to KU9C
4X21C to PA3AJW
4X22C to PA3AJW
4X23C to PA3AJW
4X24C to PA3AJW
4X2C to PA3AJW
5B4/T97Y to W2FB
5R8GY to PA3GIO
5T5U to JA1UT
5U7JK to I2YSB
5V7TD to IV3TDM
5X1D to SM5BFJ
7X3WDK to EA5KB
8J1SAI to JA1CG
8P9BK to DL1DA
8Q7QY to JA1JQY
8S5T to DF6JC
9GØARS to UA3AGW
9G1OH to EA5KB
9M6BG to VR2BG
9M6ONT to ON4ON
9N7WU to JA8MWU
9Q5BO to HB9AMO
9Q5TE to SM5BFJ
9U5D to SM5BFJ
9X/SM5DIC to SM5BFJ
A71BY to F5PYI
AX3ITU to VK3ER
BA1RB to EA7FTR
C91MR/3 to G3MRC
CE3HKF to EA7FTR
CM6YD to EA5KB
CO8OT to EA5KB
CR7DKG to W7LPF
CT1DKG to W7LPF
CVØZ to EA5KB
CV1Z to EA5KB
CX1CCC to EA5KB
CX2SA to EA5KB
CX3VB to EA5KB
D5ØDX to DL1YAW
DL2GG/YV5 to DL3AMA
DSØZR to DS5UCP
E29DX to HSØGBI
EA8ASJ to EA8ASJ
EI/W2YL to W3BW
EI/W3BW to W3BW
EK17ØØJJ to W6QKB
EN1MKN to UX7MA
EO56JM to KG6AR
EP3SP to W3HC
ET3VSC to K3IRV
F5KEF to F5ODF
FG/KC8QKF to RN3OA
FH/JJ1LIB to JN1HOW
FOØEEN to LA2KD
FOØMCA to JA3MCA
FOØRTY to JJ8DEN
FOØSCH to W6UFT
FP/K4JZ to K4JZ
H40AA to KU9C
HC3RJ to EA7FTR
HP1AC to EA5KB
HR1BY to EA7FTR
HR1RGA to EA7FTR
HR1RQF to EA7FTR
HV5PUK to IWØDJB
J28VS to F4DBF
J49DX to HA4DX
J49HW to HAØHW
J49NG to HA5NG
J8PA to PA5ET
JT1Y to IØSNY
JWØPK to SP5DRH
JX7DFA to LA2KD
JY4NE to K3IRV
JY9NX to JH7FQK
K6KO/HC8 to WM6A
K6TA/HC8 to WM6A
KH2/JM1YGG to JA1RTG
KP2/VE5RA to VA5DX
LP1F to LU5FC
M2H to GØREP
OD5/JY4NE to K3IRV
OD5UT to K3IRV
OHØZ to OH1EH
OJØU to JP1NWZ
OTØOA to ON7LR
OZ3UD to DL8UD
P41T to VE3HO
PJ2Y to G3SWH
PU3A to PY3DX
PYØF/K7BV to KU9C
PY5EG to W3HC
S92TX to W7KNT
SN45KDU to SP9KDU
SO1VOX to DL7VOX
TAØ/IT9WDY to IT9YRE
TI5X to NØKE
TL8DV to W3MC
TMØS to F5ODF
TM6TGV to F5ODF
TM9O to F5ODF
TT8JE to F6FNU
TZ6BAX to EA5KB
UA1PBP/9 to RK1PWA
UX5VL to EA5KB
V26AU to DL6LAU
V26OC to N3OC
V31GC to AKØA
VK6GIO to PA3GIO
VK9CXF to G3TXF
VK9CXJ to G3MXJ
VK9CXW to G3SXW
VP2MR to W5PB
VP8DBL to G3WOS
XX9TKW to OH2KW
YBØZZ to YBØFMT
YC3MM/5 to IZ8CCW
YV5/DL2GG to DL3AMA
YV6AZC to A5KB
Z36W to NN6C
ZB2FX to G3RFX
ZC6A to K3IRV
ZD8R to N6ND
ZD8Z to VE3HO
ZF2RS to KD5LYB
ZF2SG to KD5LYA
ZL7H to ZL1AA
ZP6EM to EA7FTR
ZP6GG to ZP6CU
ZV5A to W3HC
ZW5B to W3HC
ZX2B to PY2MNL

(The table of QSL Managers is courtesy of John Shelton, K1XN, editor of "The Go List," P.O. Box 3071, Paris, TN 38242; phone 901-641-0109; e-mail: <golist@wk.net>.)

Radio Classics

BY JOE VERAS, N4QB

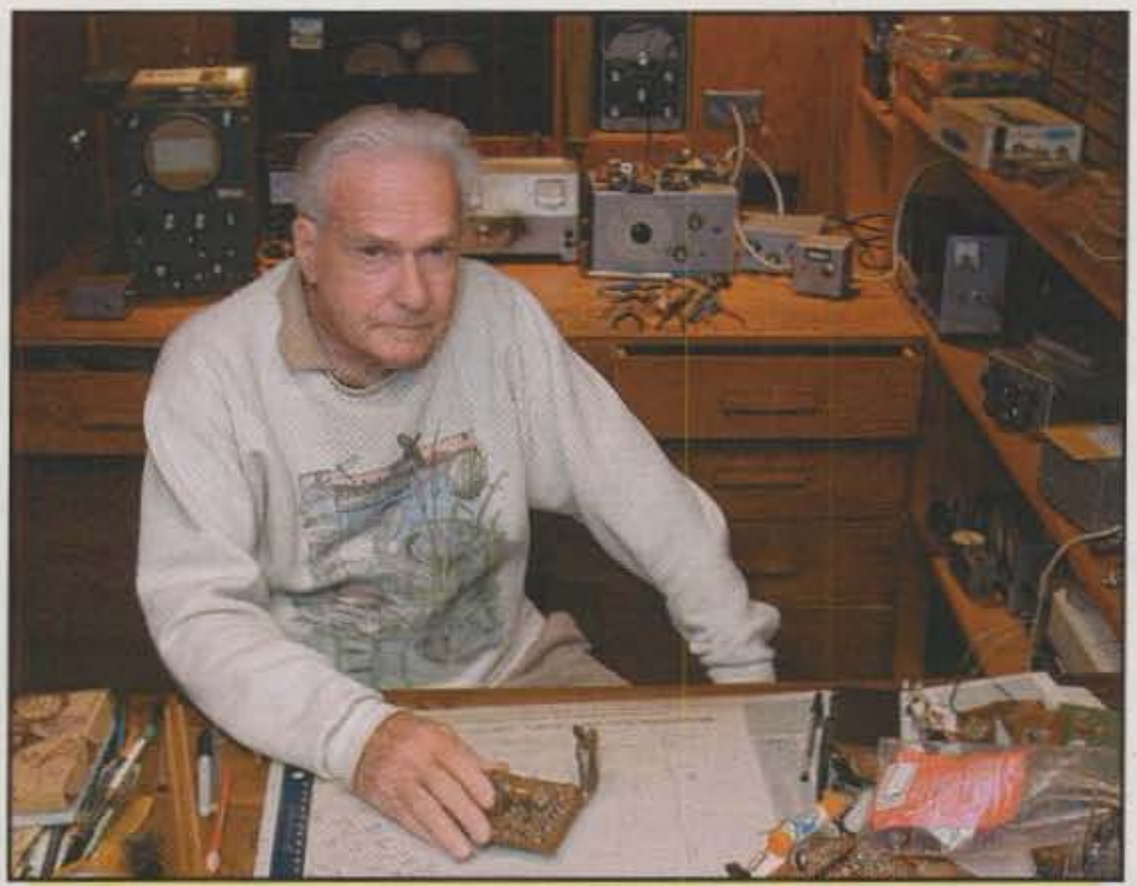
Vintage Gear and Its History

RME—A Pioneer in Amateur Radio Manufacturing

The ham shack/laboratory of W9GLW presented an environment in sharp contrast to the subject of our conversation. Clint Bowman sat in the chair across from me recounting the early days of the Radio Manufacturing Engineers company. Behind him, a single vintage radio, a 1936 RME-69, occupied a place of prominence. Every other piece of communications or test gear visible was clearly solid state, all of it home-brewed, and much of it miniaturized. As we talked about one of the dominant ham companies of the 1930s and '40s, not a single filament glowed in remembrance of days gone by.

The scarcity of vintage tube gear in Clint's shack may be a case of *been there, done that;* it is more likely the mark of a life's work driven by a restless intellect. Constant movement toward the future tends to crowd out relics of the past.

My meeting with Clint came about in a way that is typically "ham radio." He had corresponded with my friend Bill Kuning, W3BY, sometime back. His letter mentioned the early days with RME, and Bill was kind enough to send me copy of the letter, knowing my interest in the pioneering manufacturers. I noted from the return address on Clint's letter to Bill that he lived not far from my parents' home in suburban Chicago. Not long after that, my dad called to say he had become acquainted with a W9GLW when Clint spotted his K9NA license plate in the local post office parking lot. Almost before the words were out of his mouth, I said, "That's Clint Bowman!" He said, "You *know* Clint?" I told him about the letter. His visits with Clint led to my own, and to this month's column.



Clint Bowman, W9GLW, at home in his laboratory/ham shack. (Photos by Joe Veras, N4QB)

A Classic Story

When I visited Clint at his Prospect Heights, Illinois home, it was difficult for me to remain focused on the old-time radio content the title of this column implies. Each new project he showed me was more fascinating than the preceding one.

One such device is his 20 meter, CW/SSB transceiver, the subject of a comprehensive Winter 1995 *Communications Quarterly* article. I can attest to the rig's on-the-air effectiveness. Operating from his winter residence near Clearwater, Florida, Clint joined my dad, K9NA, and me in an SSB QSO one morning in January of this year. He demonstrated the little transceiver's receiving performance during my ham shack visit. Other projects I saw included a varactor-tuned VHF crystal oscillator and an SWR/wattmeter capable of accurate measurement at extremely low power levels.

All of Clint's working life has somehow involved electronics, much of it outside the realm of amateur radio. His story is a classic one, though: A ham ticket obtained as a boy is something a man can turn into a career. (My Managing Editor will, no doubt, recast the preceding sentence to read: A ham ticket obtained as a youth is something an adult can turn into a career.)

Clint celebrated his 70th year as W9GLW on February 28, 2001. He lived in Centralia, Illinois when first licensed, traveling to Terre Haute, Indiana to take the exam. His father's job transfer took the family to Peoria, Illinois in 1934, where Clint crossed paths with Radio Manufacturing Engineers.

The boxes containing the relocated Bowman family's household goods had barely been unpacked before 19-year-old Clint had an antenna strung up in his new backyard. Nothing much was heard on his home-brew, two-stage regenerative receiver as he first tuned around. The peace and quiet was shattered a couple of days later by the booming signal of W9CSZ, Eric "Shaw" Shalkhauser. A station *that* loud had to be close by, and it wasn't long before Clint discovered W9CSZ and Russ Planck, W9RGH, working in the basement of the nearby Shalkhauser residence. After introductions were made, they showed Clint the new communications receiver they were developing.

Shalkhauser was then an out-of-work Electrical Engineering professor from Bradley Polytechnic Institute, Russ Planck his former pupil. A neighbor able to handle a soldering iron was a valuable asset, and Clint was recruited, on the spot, to join the fledgling company. His first paychecks amounted to $10 for a 48-hour week. Clint observed, "It was the Depression. If you got a job, you put your nose to the grindstone and tried to keep it."

The Growth of RME

The RME staff at that time included the two principals and Clint. It soon grew to four with the addition of Russ Planck's cousin. The receiver they assembled then was the RME-9. Only four of these were produced, all of them going to the Press Wireless company for use in its overseas news service. The 9-tube, band-switching set tuned from .55 MHz to 22 MHz in five ranges and featured a built-in power supply. A single "airplane" dial dominated the front panel, and bandspread tuning was accomplished with a mechanical vernier.

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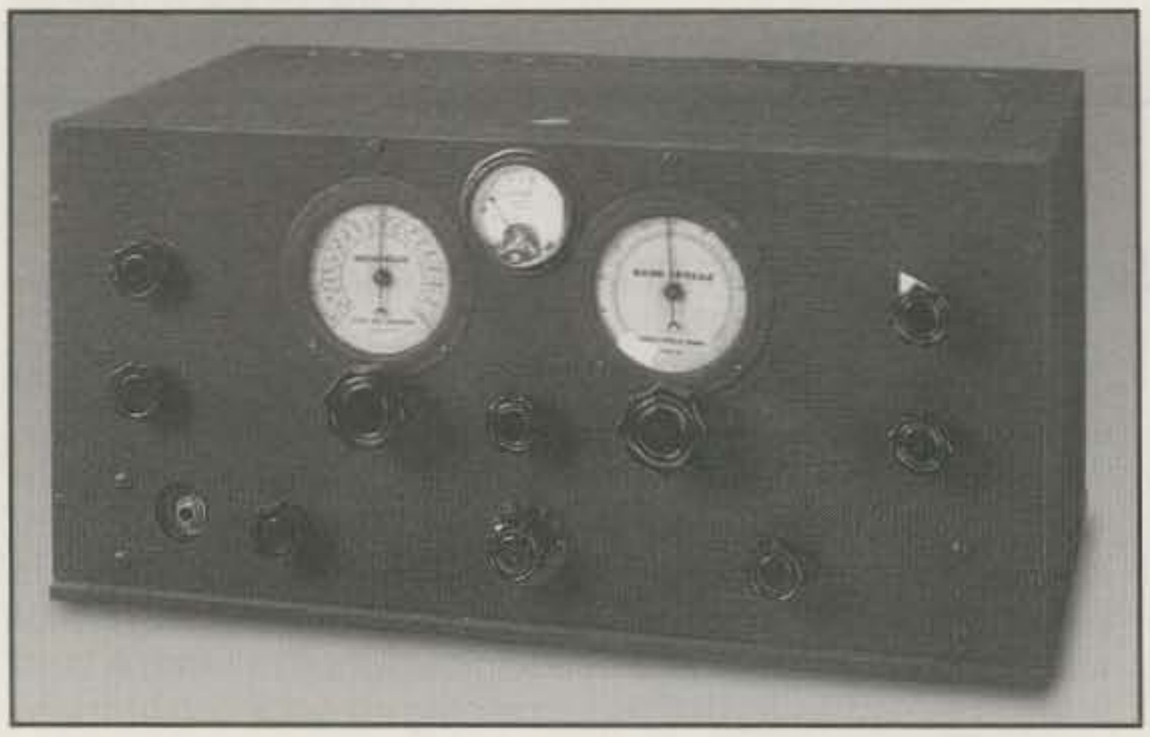
e-mail: <n4qb@cq-amateur-radio.com>



The RME-9D was Radio Manufacturing Engineers' first product for the amateur market. The knobs on the receiver pictured are not original and belong to a later vintage RME.

It is believed that all these sets were later reworked with modifications, including the addition of a second airplane dial and electrical band spread.

A new set, commissioned the RME-9D, included the above additions to the Model 9 as well as a signal-level meter, a panel-mounted peaking control for the RF amplifier and mixer circuits, and a cast-aluminum chassis. A move from Shaw's basement to a larger, storefront facility accompanied the introduction of the new model. While in the converted grocery store, the staff grew to about 15. A July 1, 1934 10 meter QSO between W9GLW and W2TP provided the inspiration for adding coverage of that band to the 9D. The broadcast band was dropped in favor of extending the tuning range up to 32 MHz.

RME-9D production was stopped in December 1935 to await the introduction of the RME-69 early the following year. Working under the supervision of Russ Planck, Clint began assembly of the 69 prototype in August of '35. New dial designs with planetary drive mechanisms were incorporated along with a signal (carrier) level meter calibrated in units from 1 to 9 as well as decibels. S9 (R9 in those days) was equal to approximately 100 microvolts across the antenna terminals of the RME-69.

The new model proved to be the most popular receiver the company would ever produce and appeared in a number of variations during its five-year run. These included AC-only and AC/battery versions, each with and without a noise limiter. A model incorporating the company's DB-20 preselector into a common cabinet was also made. The RME-69 covers .55–31.5 MHz in six bands and has a 465 kHz IF. Of particular note, many versions of the 69 had no labels for the front-panel knobs and switches.

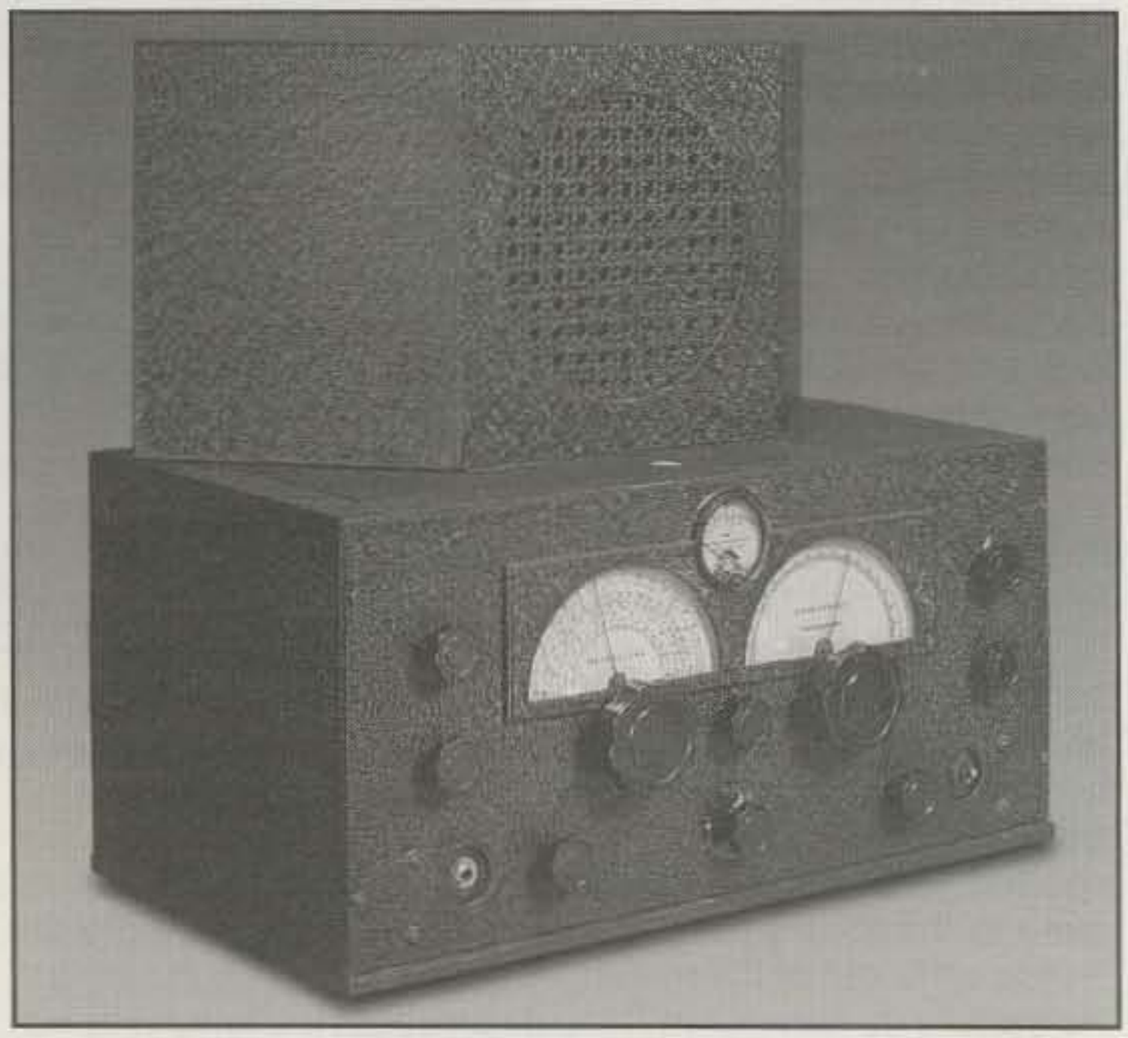
About the time the new receiver was introduced, RME moved again, this time to a proper factory facility. This location served the company as long as it remained in Peoria.

Shalkhauser and Planck, bright and capable men, each brought something different to the RME operation. Clint remembers Planck as a knowledgeable and down-to-earth engineer, a very practical man. Shalkhauser tended to be the business brains of the operation. When a new product was in the developmental stage, the men did not always see eye-to-eye on every issue or feature. When their differences were ironed out, the resulting product worked well and kept them in the game with much larger competitors.

In August of 1939 a new model, the RME-70, was introduced, but continuing orders for the 69 prompted RME to produce both models simultaneously until 1940. In reality, except for minor circuit, tube, and cosmetic changes, the 70 differed little from its predecessor. May 1940 saw both the 69 and 70 replaced by the RME-99. The new receiver featured a new front-panel layout and a fully calibrated band-spread dial for the 80, 40, 20, and 10 meter amateur bands. Both the basic look of the 99 and its loktal tubes would remain RME signatures for the next decade.

On August 4, 1940 the Hamfesters Picnic, an annual affair put on by the Hamfesters Radio Club of Chicago, was the forum for an interesting demonstration. The U.S. Navy had arranged to make test transmissions from an aircraft to show off its evolving air-to-ground communications. Receiving stations were set up at the hamfest site by participating manufacturers. Difficult conditions turned the demonstration into a competitive affair.

Some major players had direct representation. Bill Halligan and several people from his company brought along the latest Hallicrafters equipment. Other equipment, including National and Hammarlund, was set up by factory personnel, sales reps, or local dealers such as Allied Radio. The ground station set up by the Navy was unable to copy signals from the airplane. Of all the receivers employed that day, only an RME-69, manned by Shalkhauser himself, achieved solid copy. The signal from the RME was so good, in fact, that the audio was piped from the receiver into the public-address sys-



The RME-69 receiver presents a somewhat baffling front panel to the new user; none of the controls are labeled!

The Model 99, introduced in 1940, also appeared in a sloping-front-panel Deluxe *version.*

tem and broadcast to the 2500 in attendance.

Just before the onset of World War II, the RME-41/43 series replaced the 99. The RME-41 lacked the 43's crystal filter and S-meter, but could be upgraded to the more expensive model with the addition of factory-supplied modules.

The months preceding the war found Clint Bowman and RME on diverging paths. Clint took a civilian job with the Signal Corps, and RME converted its production lines to build electronics for the Navy.

Epilogue

RME's name is primarily associated with amateur receivers. The company flirted briefly with producing transmitters for the amateur radio market in 1936. Prototypes for Models 3R9, CT-100, and 5T5 were built and advertised. Few, if any, sales resulted, and RME withdrew from that venture within the year. The transmitter designs were the work of Russ Planck.

Before the Second World War, RME also produced receiver-related accessories such as converters and preselectors. Post-war, its accessory line expanded to include other items for the amateur market. The RME name appeared again briefly on an HF transmitter, VFO, and VHF transmitter manufactured by Globe (GC Electronics) in the early 1960s. By this time, the famous initials were a business commodity to be bought and sold and had no relation to the Radio Manufacturing Engineers company.

Although this month's column focuses on RME before World War II, a few words of epilogue are in order. After the RME-45 series, with roots firmly planted in the company's pre-war models, ran its course, the RME-50 and RME-79 (both borrowing heavily on the 45's design) were introduced. An entry-level receiver, the RME-84, made an appearance in 1946. The year 1953 saw Shalkhauser's retirement, the acquisition of the company by Electro-Voice, and movement of the RME facility to nearby Washington, Illinois. Ham radio slipped into the past, and the machinery began cranking out phonograph cartridges instead.

Russ Planck stayed on with the company and eventually became manager of E-V's Newport, Tennessee plant. Al Kahn, K4FW, the founder of Electro-Voice, remembers Planck as an extremely capable man, and a nice one.

As an Electro-Voice subsidiary, RME produced several new receivers. The name-plate was then based in Buchanan, Michigan with other E-V operations. The RME-4300 debuted in 1955, followed by the 4350 two years later. Electro-Voice announced the RME 6900 in January 1960. The advertisements mentioned the receiver was "Engineered under the supervision of Russ Planck, W9RGH." I have not been able to confirm that statement's truth. It is *possible* a Model 6902 receiver was marketed by GC Electronics when it owned the RME name. If anyone out there knows more about this set, or has seen one, please contact me.

My thanks to the following for allowing me to photograph the gear illustrated in this month's column: Marty Reynolds, AA4RM, RME-69 and speaker; Bill Kuning, W3BY, RME-9D; and Herman Cone, N4CH, RME-99.

My gratitude also to Clint Bowman, W9GLW, for his recollections of RME and the wealth of both verbal and written material he provided. Al Kahn, K4FW, kindly filled in information on the RME/Electro-Voice days.

A tip of the N4QB callsign cap and my sincere thanks to Jim Jorgensen, K9RJ, and Ron Payne, WA6YOU, as well as their families. Their hospitality was superb and the fellowship great during my recent visits to their homes for calendar/book photo shoots.

My interest in RME is long-standing and an emotional one as well; an RME-45B is the proud centerpiece in a 1958 photo of my Novice station. I would enjoy hearing from anyone out there with additional information on the company or its products. 73, Joe, N4QB

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Contesting

BY JOHN DORR, K1AR

News/Views Of On-The-Air Competition

2001 CQ Contest Survey—The Final Results

August's Contest Tip of the Month

Have you ever requested your UBN report for any of the major contests? In most cases, they are readily available from contest organizers and can be an excellent tool to point out weaknesses in your operating accuracy. Take a minute and ask for yours. In some cases (such as the CQ WW) they are available on-line. A little post-contest analysis may help you discover new ways to improve your log's accuracy, resulting in a higher score in future contests!

I always enjoy reporting on *CQ*'s Contest Surveys, as each and every year I learn something new about the contest community and what's on your mind. This year is no exception. Your responses confirmed the assumption that nearly every participant is a "connected" computer user. To prove the point, let me share some of the facts.

With nearly 400 replies received at deadline time, only 19 of them came via traditional snail mail (4.8%). A new metric in contesting was born as I enjoyed a "45-hour" of inbound responses immediately after availability of the on-line version was announced on the CQ Contest e-mail reflector.

There are a number of hot topics being debated in contest circles these days. They range from an insatiable appetite for focusing on operating ethics to the use of packet spotting. It therefore shouldn't surprise you that we decided to focus on those areas in this year's version, and the answers were very interesting indeed.

Well, enough with the introductions; let's get right to the results. As always, I appreciate the time you took to submit your responses. You can count on this input to be the source of future contesting columns in *CQ*.

The Results of the 2001 *CQ* Contest Survey

Contesting Experience (in years): 18.78

This question provided mostly traditional results when analyzed a bit further. For most of us, contesting started in our teenage years. However, it is interesting to note that one gentleman in our survey *began* his contesting career at the age of 62! It just goes to show that it's never too late to start a new passion in life.

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e-mail: <K1AR@contesting.com>

Calendar of Events

July 28-29	IOTA Contest
July 28-29	Russian RTTY WW Contest
July 28-29	Venezuela Ind. Day CW Contest
Aug. 4-5	North American CW QSO Party
Aug 4-5	ARRL UHF Contest
Aug. 5	YO DX Contest
Aug. 11-12	WAE CW Contest
Aug. 11-12	Maryland/DC QSO Party
Aug. 18-19	SARTG RTTY Contest
Aug. 18-19	North American SSB QSO Party
Aug. 18-20	New Jersey QSO Party
Aug. 25-26	Ohio QSO Party
Aug. 25-26	Hawaii QSO Party
Aug. 25-26	South Dakota QSO Party
Sept. 1-2	All Asian SSB DX Contest
Sept. 2	North American CW Sprint
Sept. 8 - 9	Worked All Europe SSB Contest
Sept. 9	North American SSB Sprint
Sept. 15-16	SAC CW Contest
Sept 22-23	SAC SSB Contest
Sept. 29-30	Texas QSO Party
Sept. 29-30	**CQ/RJ WW RTTY DX Contest**

Average Age: 47.53 years

In comparison, the average age in previous *CQ* Contest Surveys were as follows:

1995—43.4 years
1996—44.2 years
1997—45.3 years

While it appears the rate of increase is slowing down, it is disturbingly high. DJ1YFK wins the prize as the youngest participant (and master of CW at 70 wpm!) at the ripe old age of 17.

1. Is there anything about your station that you consider to be unique?

Actually, most of you professed to have nothing particularly unique about your station (74.6%, to be precise). A few claimed the owner to be unique, but I digress! For those who did respond, the focus seemed to be on interesting methods of antenna switching, SO2R (single op, two radio) configurations, station location, a contest-friendly spouse (often overlooked), and unique antennas. Based on the feedback, I would like to highlight a few of these in more depth in future columns. Stay tuned.

2. How has your ability to copy CW changed over your years of contesting experience?

a) Declined—30 (7.9%)
b) Stayed the same—69 (18.1%)
c) Improved—282 (74.0%)

This was a very encouraging set of responses. What it told me was that contesters are not only interested in continuing to invest in CW (see question 3), they are getting better at it. One respondent, for example, pointed out that his CW speed has nearly doubled over the past few years of contesting.

3. What do you estimate your comfortable CW copying speed is today?

Average Response: 32.88 wpm

In considering this question "after the fact," I must admit that there is a range of criteria for copying CW. For example, many of us can copy contest exchanges (and even callsigns) at extraordinary rates of speed. However, when we fire a question at someone at the same rate, the proverbial "question mark" comes back in our headphones. Like most of you, I'm disturbed by this and want to encourage us to build our CW skills beyond the rather thin ability of copying a series of numbers and callsigns.

4. If you had to pick only one mode for contest operating, what would it be?

a) SSB—111 (29.0%)
b) CW—265 (69.2%)
c) Digital— 7 (1.8%)

One word describes my reaction to the response to this question—fantastic! OK, yes, I'm biased towards CW operating, but it appears I'm not alone. And, for you aficionados of the digital world, hang in there. There's plenty of company during any digital contest or major DXpedition.

5. Over the last two years how much money have you invested in your contest station?

Average investment: $5,386

I heard you when you mentioned that this number should also reflect other investments such as contest travel, friends' stations, etc. However, the number is impressive nonetheless. I wonder what we'll see in future years as the sun goes to sleep and our stock options remain underwater in the "new economy" of the 21st century. Also, I have to share one fellow's answer with you. He indicated that he spent $11,457 on his station. I'll bet his unique numbers are impressive if he's as much of

a stickler with his logs as he is in the area of accounting.

6. Which of the following statements most reflects your feelings about ethics in contesting?

a) There is no cheating in contesting—7 (1.8%)

b) A few people cheat, but not enough to really matter—244 (64.4%)

c) There is enough cheating in contesting for it to be a serious concern worthy of further action—115 (30.3%)

d) Cheating in contesting is so pervasive that the competition is essentially meaningless—13 (3.4%)

Well, we're looking at a classic bell curve here, wouldn't you say? The good news is that our bell does seem to be skewed towards limited amounts of cheating, however. Obviously, that's a good thing, but it does make you wonder about the results of the next question (read on).

7. From your personal experience, have you witnessed the intentional violation of rules or regulatory guidelines in a contest operation?

Yes—214 (56.0%)

No—168 (44.0%)

We were feeling pretty good about ourselves when looking at question 6, until I ran the results of this one. Over half of us have witnessed intentional rules violations. Unfortunately, I did not receive very many comments on this one beyond the yes/no answers you provided. However, some of you commented that your observations were based on a strict interpretation of certain rules (e.g., running 1800 watts output, calling USA stations on SSB below 7040, etc.). While I think the net result of these two questions leads me to believe that the health of our contest integrity is intact, we are hardly lily white, which may have precipitated the 47 anonymous responses I received in this year's survey edition.

8. Do you currently have TVI/RFI problems when operating contests?

Yes—137 (35.9%)

No—245 (64.1%)

There's good news, dear neighbors; we are making progress (along with consumer equipment manufacturers) on the TVI/RFI front. However, having said that, there are also a disturbing number of us who continue to light up our neighborhoods in a big way. I'd bet you can tie these answers to the living situations of many of the respondents. For example, if you're fortunate to live on a 100 acre ranch, you probably have a different situation as compared to a ham living in an apartment in New York City. Next time we'll try to understand that point better, okay?

9. If yes to question #8, how has the problem changed in recent years?

a) My TVI/RFI problems have gotten worse—46 (31.3%)

b) My TVI/RFI problems have stayed the same—53 (36.1%)

c) My TVI/RFI problems have improved—48 (32.6%)

What I learned in these responses is that some of you are actively trying to improve your neighborhood relations, while others simply don't care. Some of you who replied to this one indicated that while your desire is to not add your neighbor to your operator list for the next multi-op event, you do want to keep everyone happy and will do what it takes (within reason) to meet the challenge. Good luck!

10. Do you feel the penalties as-

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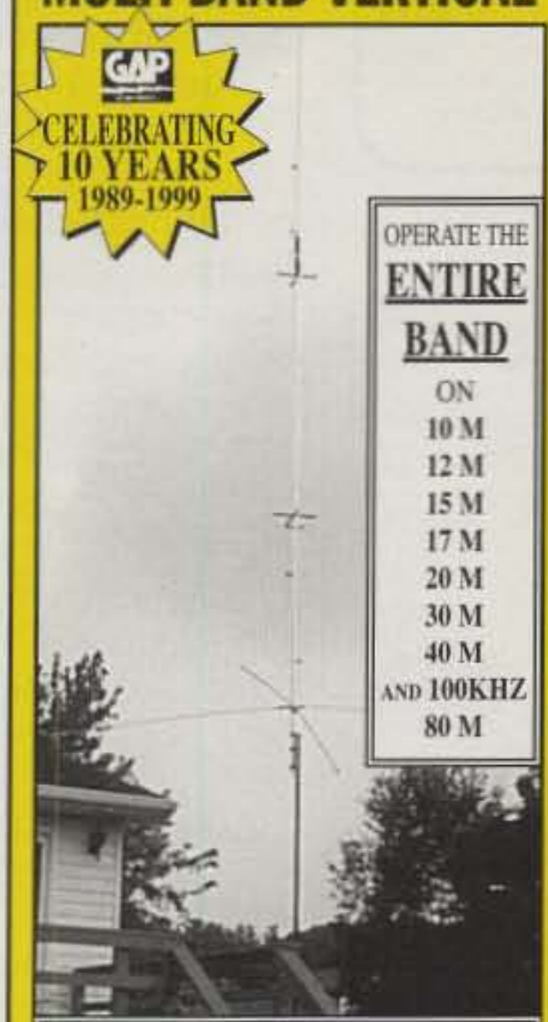

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Call Area	No. of Responses	DX	No. of Responses
WØ	15	8P	1
W1	53	9A	1
W2	35	C6	1
W3	36	DL	4
W4	44	EA	2
W5	24	EI	1
W6	14	G	4
W7	13	GM	1
W8	27	GW	2
W9	21	I	3
VE	8	KL7	1
		LU	2
		LX	1
		LY	1
		LZ	1
		OH	2
		OK	2
		ON	2
		OZ	1
		PA	3
		PY	2
		S5	1
		SM	2
		SP	2
		UA	1
		VK	1
		YL	1
		YU	1
		ZF	1
		ZS	1

USA/Canada responses: 290
DX responses: 49 (30 countries)
None indicated: 47
Total responses: 386

Table I– 2001 Contest Survey geographic response analysis.

sessed as part of the log-checking process in contests are too extreme?

Yes—130 (34.0%)
No—252 (66.0%)

Respondents to this question could be bifurcated somewhat between high scoring, active contesters and the more casual crowd. Put another way, the serious contesters (based on scores) seemed more concerned about the log-checking methods than those of the laid-back contingent. It was encouraging to see that we clearly view a desire to maintain a high standard for our logging accuracy. Additionally, we support a reasonable penalty structure as is currently being applied by most major contest sponsors. With a two-thirds majority, it appears the "no's" have it on this one, gang.

11. How would you rate the overall quality of contest operating compared to years past?

a) Improving—190 (49.9%)
b) Declining—69 (18.1%)
c) No change—122 (32.0%)

The answers to this one, frankly, surprised me. At the risk of playing my own bias card for this question, I'm not as personally supportive of the notion that contest operating is improving. Rather, I see score escalation taking place more from the combination of our recent sunspot maximum and increased activity in certain geographies. If you're so motivated, please tell me more about your thinking and I'll be glad to pass it along.

12. Should packet radio spotting be eliminated from contesting, regardless of operating categories?

Yes—125 (32.6%)
No—259 (67.4%)

One of our most controversial subjects in this year's survey, packet appears to be here to stay if measured by your input. Several of you mentioned that you were not as opposed to packet spotting and contesting per se, but in its legal use in single operating with contests such as the Worked All Europe and others.

13. Should 48-hour contests be shortened?

Yes—135 (35.5%)
No—245 (64.5%)

The traditionalists reigned supreme on this one. For those of you who cast a dissenting vote, the arguments were very reasonable. They included family impact, physical limitations, activity levels, etc. My guess is that if our average age continues to escalate, we may be looking at shorter contests some day. Until then, take your "No-Doze" tablets if you want to play in the big leagues.

14. If yes to question 13, what would be your recommended time duration for major contests?

Average recommended time: 28.83 hours

Although a peculiar "average" number, most of you fell into the 24, 30, or 36 hour group. For those of us who still attempt to operate the "full 48," I'm not sure what I'd do with all that rest. Imagine being able to function on Monday after a contest? What would our spouses say if they actually saw us climb out of our operating dungeons during a contest weekend?

Final Comments

As is always the case, I want to thank all of you for participating in this year's contest survey. In addition to proving that your interest in contesting is alive and well, you've also shown your desire to use the internet for this kind of activity, as seen by the high percentage of on-line responses. There are several areas of analysis in this year's survey results that time and space did not permit. Look for some additional analysis next month. 73, John, K1AR

Awards

BY TED MELINOSKY, K1BV

News Of Certificate And Award Collecting

This month we begin with a profile of Carol-Ann Reitman, AB2LS, USA-CA All Counties #1017.

Prior to coming to America from Scotland I was a primary school teacher for almost 20 years. Growing up I knew of amateur radio operators. One lived four houses along the road from me, and my cousin, later to become a licensed operator himself, when he came to visit us would disappear to John Simpson's house to watch and listen to him operate. That shack was a strange place with large pieces of equipment with many knobs and "bulbs" that mysteriously lit.

When I came to my new home in 1986, Aaron, WA2AKB, wanted me to become a "ham." To be truthful, I wasn't interested, but I tried learning code and theory anyway. As soon as it was learned it was forgotten.

On a visit to Aaron's cousin Ron, KA3DRO, in 1989 we were introduced to county hunting. Ron produced his coloring book, and when questioned as to what it was, he proceeded to tell us of the enjoyment of this particular part of amateur radio.

Carol-Ann Reitman, AB2LS, USA-CA All Counties #1017.

WA2AKB became involved in chasing counties and I sat beside him logging, recognizing callsigns, voices, and generally feeling quite happy sharing this hobby. We attended one of the "mini" conventions in Holland, Michigan, and we were able to put faces to callsigns. (It's strange how one's concept of how a person should look is quite different from reality!) Aaron wanted me to share this part of his hobby, but I was still content to log runs and enjoy the scenery. The pattern continued for several years.

Then a momentous day arrived; we went to a VEC test center. I walked in and felt very unprepared, so walked out and refused to go back in. The idea was dropped and not mentioned again. Meanwhile we set out on trips to give out counties in New York State and the northeast part of the US. We also transmitted from counties on our way to and from Florida twice and on another trip out to the Michigan "mini."

On three occasions we were able to have an "eyeball" with the big riggers—KC1NA, N8MYC, and KBØGZR. Great fun to meet these guys in person!

In the summer of 1999 we visited with KA1JPR and several other county hunters. Percy sent me a tape to help me learn code. As I walked the dog every morning I faithfully listened to code. Then I practiced copying code when I got back home. I decided that getting my license would be my goal for the end of the century. I attended theory classes, and in October of 1999 I sat for my Novice and Tech Plus theory and code tests. I passed! My callsign was posted on the ARRL website: KC2FPW was an official ham!

How I practiced code after that, encouraged by my husband. Finally I was copying 12–13 words per minute when I was told of the restructuring. I concentrated on General theory and in February 2000 I got my General ticket and couldn't wait until April 15th when I could join the county hunters. The rest in history! The radio went on at 8 AM and was shut down around 9 PM. I had a radio in my car (a present for passing my General license), and we had another in the Expedition vehicle, so I was never far from a radio. I was "hooked"!

Last summer we attended the MARAC national convention in Michigan, and I also went to the 3M mini in Tennessee in October, so I had the opportunity to make more friends. On March 5, 2001 I worked Bob, N4CD, for #3076. I had reached the "magic" number in less than 11 months.

Now I'm anticipating finishing "bingo," working on a second time around, and meeting old and making new friends in Virginia in the summer.

I also have a brand-new callsign—AB2LS. While waiting for contacts when numbers were getting low I had to do something to pass the time. What better way than to work on my Extra theory? That wasn't easy, but on March 3, 2001 I passed the Extra Class exam, much to my delight!

Thanks to all on 14.336 for all the contacts and making this new hobby for me FUN! I hope to be part of the net for many years and to take a more active part in helping mobile operators who are out there for all of us.

—73, AB2LS

65 Glebe Road, Spofford, NH 03462-4411
e-mail: <k1bv@cq-amateur-radio.com>

USA-CA Special Honor Roll

Frank Soloman, W1WKP
USA-CA All Counties #1020
May 16, 2001

Jim Cunningham, VK4BS
USA-CA All Counties #1021
May 21, 2001

Guy Mathis, AC9X
USA-CA All Counties #1022
May 22, 2001

USA-CA Honor Roll

500

XQ5SM 3153
HB9LCW.....3154
KA4NZG 3155
W1WKP 3156
OY3QN 3157
PA3ARM.....3158
VK4BS 3159
AC9X 3160

1000

W1WKP 1571
KA4NZG 1572
VK4BS 1573
AC9X 1574

1500

W1WKP 1311
VK4BS 1312
AC9X 1313

2000

G3LAS 1210
W1WKP 1211
VK4BS 1212
AC9X 1213

2500

W1WKP 1133
VK4BS 1134
AC9X 1135

3000

W1WKP 1040
VK4BS 1041
AC9X 1042

The total number of counties for credit for the United States of America Counties Award is 3076. The basic award fee for subscribers is $6.00. For nonsubscribers it is $12.00. To qualify for the special subscriber rate, please send a recent CQ mailing label with your application. Initial application may be submitted in the USA-CA Record Book, which may be obtained from CQ Magazine, 25 Newbridge Road, Hicksville, NY 11801 USA for $2.50, or by a PC-printed computer listing which is in alphabetical order by state and county within the state. To be eligible for the USA-CA Award, applicants must comply with the rules of the program as set forth in the revised USA-CA Rules and Program dated June 1, 2000. A complete copy of the rules may be obtained by sending an SASE to Ted Melinosky, K1BV, 65 Glebe Road, Spofford, NH 03462-4411 USA. DX stations must include extra postage for airmail reply.

USA-CA Topics

Australia. January 14th saw VK4AAR complete USA-CA. On March 31st it was VK3MW, and most recently, on May 21st, VK4BS completed the award. Three from Australia in such a short period of time is simply incredible! It's too bad N8STF couldn't make in-person presentations to all of them, as he did for VK4AAR *(see last month's column)*. If *CQ* wants a volunteer, I'll go!

County lines. We've learned that at least one state QSO party would accept mobile contacts for county lines when the mobile might be "within 100 yards" of the line. The issue of safety was brought up, as was the point that the line might be in the middle of a bridge, and it wouldn't be possible to stop there. *CQ*'s answer is that neither of these situations would produce a valid county-line contact. One or the other would be good, but not both.

If you've made a contact in such a situation, please don't use it for USA-CA.

The 4X2K Award commemorating 2000 years of history in the Holyland.

The sad fact is that in almost all of these cases we'll never learn about this. It's one of the reasons why I have more queasy feelings about county-line contacts than I do about any other aspect of county hunting.

Computer Lists and County Booklets. Both may be used for any level of USA-CA. A computer-prepared list should include as a minimum all of the information provided in the booklet. Also, when submitting contacts for an endorsement, the rules require a complete list of contacts up to that point, not just the new qualifying ones.

USA-CA Fees. The current fee for a new award for *CQ* subscribers is $US6, or 7 IRCs. Please include a copy of a recent *CQ* mailing label with your application. Otherwise, the fee is $US12, or 20 IRCs. Endorsements are $1.25, or 2 IRCs, for everyone no matter how many endorsements are being processed.

DX Awards

First, a correction: In the December 2000 column I ran the rules for The Crimea award, a beautiful certificate showing a historic castle on the Black Sea. Unfortunately, the fee was omitted. It is $US5, or 10 IRCs, and should be sent to Dainius V. Savicius, LY1DS, P.O. Box 1274, Vilnius, 2056 Lithuania. LY1DS helps the sponsor, UU2JQ, with a more secure postal system.

2000 Years of History in the Holyland Award (4X2K). The 4X2K award, from Israel, was designed to promote historic sites related to the beginning of Christianity in the Holyland and at the same time raise funds for the reforestation of Israel. The certificate is a handsome mix of modern art and traditional design, and the award is well worth the time it takes to pursue it.

Operations that qualify for the 4X2K award must take place from January 1, 2000 until December 31, 2001. All bands, including the WARC bands, and all modes are permitted. (Relays and cross modes are excluded.)

Seven major historic sites related to the life of Jesus were selected. Each is marked with a number: 1 for the Bethlehem region, 2 for the Nazareth region, 3 for the Jerusalem area, 4 for the Tiberias and the Sea of Galilee, 5 for the Galilee (excluding Tiberias and the Sea of Galilee), 6 for the Samaria region, and 7 for the Judea region.

Requirements: Earn a minimum of 300 points while working at least 5 of the major historic sites.

Credits and points:

1. A QSO with a station operating from a major historic site is worth 5 points.

2. A QSO with a Holyland (Israel) station located outside the major historic area is 1 point.

3. Special station 4X2K will operate as /area number throughout the year. A QSO with this station is worth 20 points (e.g., if 4X2K/3 operates from Jerusalem, then a QSO with this station is 20 points and a credit of area 3 for Jerusalem). Each area counts only once for the award.

4. All QSOs made during the Holyland contest will count double points (e.g., a QSO with a station operating from a major historic site during that time credits 10 points).

Limitations: A station operating from a specific major historic area counts only once. The same station may be worked again only from another major historic area. The same rule applies for stations operating outside the major historic areas.

Exchange: Report must include callsign and the major historic area number, plus RST report. For stations located outside the major historic areas the exchange includes just callsign and RST.

Fees: The basic fee is the price of one tree to be planted by the Forestry Department in one of the major historic areas ($US10, or 12 IRCs). A certificate will be issued in the name of the amateur who contributed the fee. Special certificates are also available for ten trees or more.

Applications must include callsign, RST reports, date, time (UTC), and major historic area. Also, all calculations for credit must be clearly specified on the log. Operator callsign, name, country/state, address/mail address, and zip code must be clear on the log form. No QSLs are required.

All logs must be sent before March 3, 2002 to the award manager either via the bureau or home address: Yoram Gottesman, 4Z1GY, 1 Kehilat Jitomir St. Neot Afeka, Tel Aviv 69410 Israel (e-mail: <high_test@ibm.net>).

Belgium's OSA Award. A very interesting collection of castles and magnificent buildings in the Antwerp, Belgium area adorn this full-color certificate.

The award is issued to all who make contact with club station ON4OSA or with members of the OSA club.

Amateurs or SWLs may qualify for the award, all bands and modes, but no use of repeaters. Contacts on or after January 1, 2001 are valid.

ON stations need 20 points, EU 15 points, DX 10 points. Point values are (listing indicates station type, followed by points for FM, SSB, and CW or any other mode):

Club member—1 point, 2 points, 3 points.

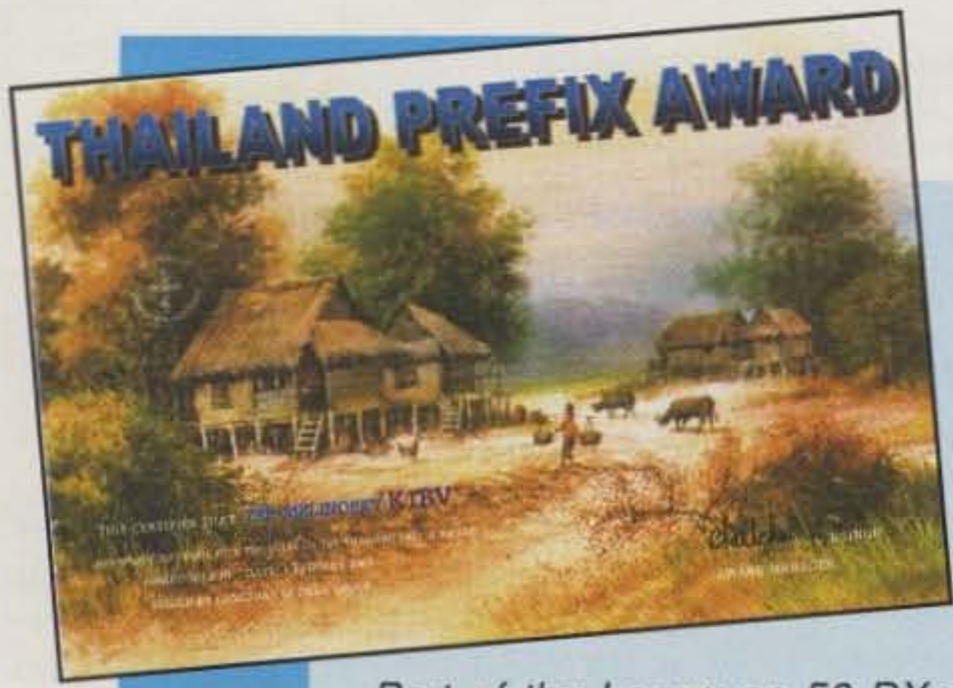
Club station ON4OSA—5 points, 6 points, 7 points.

Club station ON4OSA using special prefixes such as ONxxOSA, OQ, OPO, OR, OS, OT; and ON4OSA/?—10 points, 11 points, 12 points.

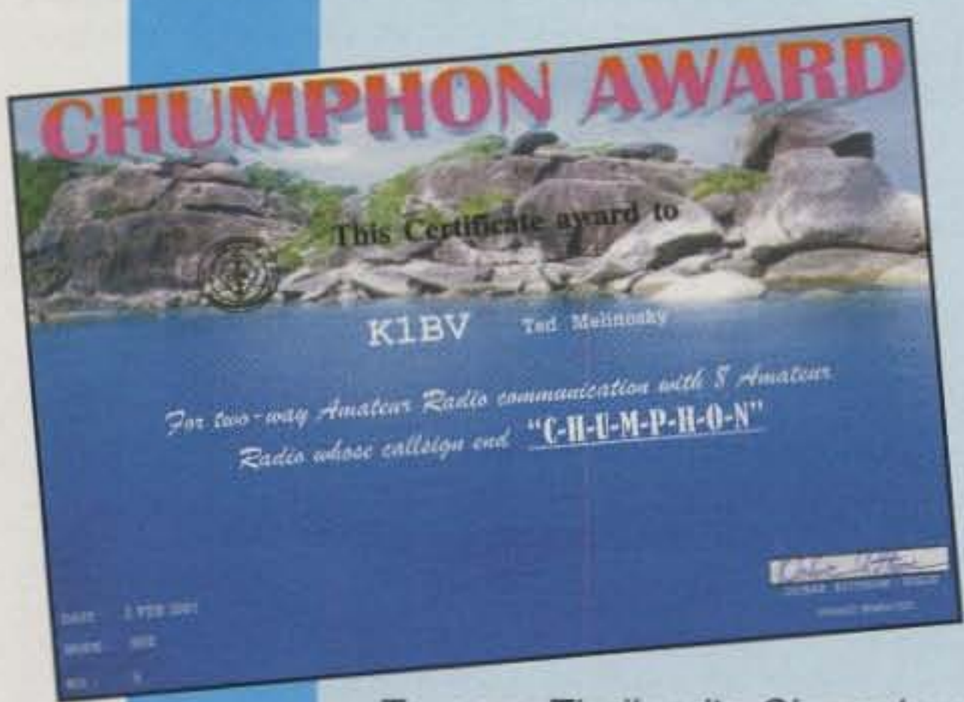
Send GCR list and fee as follows: Belgian stations 200 Bef, or $US5; European stations 250 Bef, or $US6; DX stations 300 Bef, or $US7. Apply to: Rottier Koen, ON1CJE, J.B. Pittoorsstraat 48, B-2110 Wijnegem, Belgium.

Langsuan, Thailand 56 DXer Group Program. USA-CA certificate holder HS1NGR worked with his radio club in Langsuan, Thailand to help create this excellent series of certificates which have fairly modest requirements for the DXer.

Belgium's OSA Award is issued for making contact with club station ON4OSA or members of the OSA club.



Part of the Langsuan 56 DXer Group program is the Thailand Prefix Award.



To earn Thailand's Chumphon Award contact any eight stations worldwide and using the last letter of the suffixes spell the word "CHUMPHON."

For the Worked All Thailand Award work ten different Thai stations; DX stations need only five.

General requirements: GCR list accepted. All modes and bands. Fee for each of the awards is $US7, or 10 IRCs. SWL okay. Apply to Chartchai V, HS1NGR, P.O. Box 20, Langsuan Chumphon 86110, Thailand. (For the Chumphon Award, apply to: Ochar Rittisom, HS8LR, P.O. Box 20, Langsuan Chumphon 86110, Thailand).

Thailand Prefix Award: Work ten different Thailand prefixes; DX stations only need five.

Worked All Thailand Award: Work ten different Thai stations; DX stations only need five.

Chumphon Award: Contact any eight stations worldwide, and using the last letter of the suffixes, spell the word "CHUMPHON."

Correction

In the June column we published details of the Six on Six Award. The correct sponsor of the award is Robert T. Mobile, K1SIX, 33 Kimball Hill Rd., Hillsboro, NH 03244.

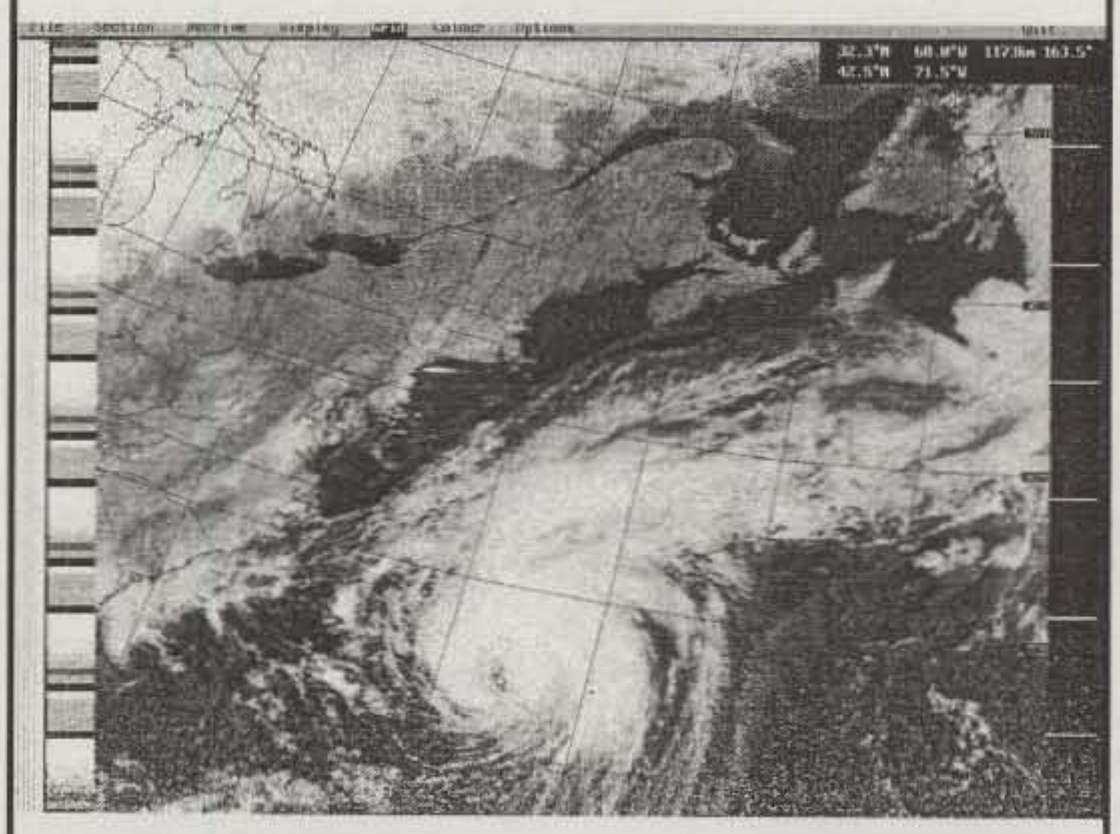
Internet Site of the Month

Yes, there is an animal the Tasmanian Devil. It's not just a cartoon character. The Tasmanian Division of the Wireless Institute of Australia sponsors this unusual certificate. The full details (plus a picture of the animal) are listed on the web at the following URL: <http://www. qsl.net/vk7rt/tdaward.html>.

Does your club sponsor a certificate or award? Send me full details and a sample for some free, but priceless publicity in *CQ*.

73, Ted, K1BV

WEATHER SATELLITE SYSTEMS



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BY GEORGE JACOBS, W3ASK

The Science Of Predicting Radio Conditions

Slow Decline of Sunspot Cycle 23

The Royal Observatory of Belgium reports a mean sunspot number of 108 for April 2001. This number is based on the weighted average of daily telescopic observations made at a worldwide network of 34 cooperating observatories.

Daily sunspot activity varied considerably during April. The count reached a high of 186 on April 1st and a low of 28 on the 17th. The mean value for April results in a 12-month running smoothed sunspot number of 115 centered on October 2000. This is a drop of one from last month's smoothed number. The smoothed sunspot number is a 12-month average of monthly mean values centered on the middle month. This tends to smooth out daily and month-to-month variations. The solar cycle is measured by its smoothed monthly numbers. A smoothed sunspot count on the order of 105 is forecast for August 2001.

A corresponding small decrease was reported in the 10.7 cm solar flux level. Canada's Dominion Radio Astrophysical Observatory in Penticton, B.C. reports a monthly mean of 194 for April 2001. This results in a smoothed value of 177 centered on October 2000. A smoothed level in the lower 170s is forecast for August 2001.

August Propagation

August and early September are perhaps the most difficult period of the year for which to make an HF propagation forecast, because this time period marks a transition from summer to wintertime ionospheric conditions.

On many days typical summertime conditions will prevail, and the bands will sound much as they did during July. On other days, particularly as September approaches, conditions will begin to conform more to a winter pattern of higher daytime and lower nighttime usable frequencies. Since this is a period of transition, this month's DX Propagation Charts cover only a *one-month* period, rather than the usual two-month span. Short-Skip Charts for use during August appeared in last month's column.

11307 Clara Street, Silver Spring, MD 20902
e-mail: <george@gjainc.com>

LAST-MINUTE FORECAST

Day-to-Day Conditions Expected for August 2001

	Expected Signal Quality			
Propagation Index.....	(4)	(3)	(2)	(1)
Above Normal: 8, 11, 14, 21	A	A	B	C
High Normal: 1, 6-7, 10, 12, 17-18, 20	A	B	C	C-D
Low Normal: 3-5, 9, 13, 16, 19, 23-25, 27-28, 31	B	C-B	C-D	D-E
Below Normal: 2, 15, 22, 30	C	C-D	D-E	E
Disturbed: 26, 29	C-D	D	E	E

Where expected signal quality is:

A—Excellent opening, exceptionally strong, steady signals greater than S9.

B—Good opening, moderately strong signals varying between S6 and S9+, with little fading or noise.

C—Fair opening, signals between moderately strong and weak, varying between S3 and S9, with some fading and noise.

D—Poor opening, with weak signals varying between S1 and S6, with considerable fading and noise.

E—No opening expected.

HOW TO USE THIS FORECAST

1. Find the *propagation index* associated with the particular path opening from the Propagation Charts appearing on the following pages.
2. With the *propagation index*, use the above table to find the expected signal quality associated with the path opening for any given day of the month. For example, an opening shown in the Propagation Charts with a *propagation index* of 3 will be good (B) on Aug. 1st, fair-to-poor (C-D) on the 2nd, fair-to-good (C-B) on the 3rd through 5th, good (B) on the 6th through 7th, etc

During the daylight hours good DX conditions should be possible on five bands: 10, 12, 15, 17, and 20 meters. Of the five, conditions should be best on 15 meters, with peak conditions expected to most areas of the world during the afternoon hours. While the 17 and 20 meter bands should be open for DX throughout the daylight hours, peak signals are expected during an approximate two-hour window immediately following sunrise and again during the late afternoon. Some fairly good DX openings should also be possible on 10 and 12 meters during the hours of daylight, particularly along an arc extending across central Africa, Latin America, and into the far Pacific area. Peak conditions should occur during the afternoon hours, but an increasing number of earlier openings should be possible by early September.

Between sundown and sunrise 20 meters is expected to be the best DX band. Openings should be possible to almost all areas of the world, often with exceptionally strong signal levels. Until midnight good DX conditions should also be found on 15 and 17 meters for openings toward Latin America, the far Pacific, and into Asia. Fairly good nighttime DX conditions are also expected on 30, 40, and 80 meters despite high static levels at times. Openings should be possible before midnight along an arc extending from northern Europe, through Africa, and into Latin America, the far Pacific, and Asia after midnight.

By late August it should be possible to work some DX on 160 meters during the hours of darkness. Conditions on this band, as well as on 40 and 80 meters, will tend to peak just as the sun begins to *rise* on the *light*, or easternmost, terminal of a path.

Short-Skip Conditions

For openings over distances ranging between 50 and 250 miles use 80 and 40 meters during the day and 80 and 160 meters at night. Between 250 and 750 miles the best bands should be 40 and 30 meters during the day and 40 and 80 meters during the hours of darkness. For openings between 750 and 1300 miles the best bands should be 20 and 17 meters during the day, with some fairly good openings also possible on 15 meters. From sundown to midnight try 40 and 30 meters, and from midnight to sunrise conditions should be best on 80 meters. Between 1300 and 2300 miles the best daytime bands should be 20 and 17 meters, with some good openings also possible on 15 meters. Try 30 and 40 meters during the hours of darkness.

VHF Ionospheric Openings

While sporadic-*E* propagation is expected to taper off considerably by mid-August, some 6 meter openings should still be possible over distances of approximately 750 to 1300 miles. During periods of intense and widespread sporadic-E ionization, two-hop openings may be possible considerably beyond this range. Check the 2 meter band for an occasional sporadic-*E* type opening between approximately 1200 and 1400 miles. While these types of short-skip openings can take place at any time, as the name implies, during the late summer there is a tendency for

Dayton's 2001 Radio Amateur of the Year Presentation

The 2001 Radio Amateur of the Year award bestowed upon George Jacobs, W3ASK, by the Dayton Amateur Radio Association for "his contributions to amateur radio, both technical and fraternal, which have furthered the state-of-the-art for more than half a century.

On Saturday evening, May 19th I reached the pinnacle of my 60 years as a radio amateur! I had the honor of receiving the 2001 Radio Amateur of the Year award from the Dayton Amateur Radio Association at the banquet marking the 50th annual Hamvention®. The award was given to me "for 50 years as Propagation Editor of *CQ*, for the roles played in Project OSCAR, the first amateur radio satellite to be launched into space, and in the formation of AMSAT, and for contributions to Amateur Radio, both technical and fraternal, that furthered the state-of-the-art for more than half a century."

I would like to share my acceptance remarks with the readers of this column:

Being both a radio amateur and a broadcaster, putting a microphone in front of me for a few remarks could be dangerous. You may have to forcibly take it away from me.

Don't worry, however. This will be short. My wife warned me last night not to pull a Julia Roberts, referring to her recent Oscar acceptance remarks. Just keep it short like Regis Philbin did last night when he spoke for less than a minute to acknowledge two Emmies. I am also told that there is someone behind that curtain with a hook to grab me if I run over my allotted five minutes. I understand that the Dayton Amateur Radio Association has had to resort to this at least once in the past.

Cathi Hoskins, N8ZCQ, who has done such a marvelous job in organizing this evening's events, called me about two months ago with the surprising news to me that I had been selected by the Dayton Amateur Radio Association, know affectionately in this town as DARA, to receive tonight this year's prestigious Radio Amateur of the Year award. And a very pleasant surprise it really was. I detected no signs of it happening. In fact, I had already accepted an invitation to attend a major high-frequency broadcasting conference in London, which began this weekend. But amateur radio holds a very special place in my life, and I was able to gracefully cancel out of the London meeting.

This is a very special event for me. The first year of this new millennium is already a golden one. This is the 50th anniversary of the DARA Hamvention®, known worldwide as the biggest of all amateur radio gatherings. I understand that this year's attendance is very likely to pass the 20,000 mark. This year also marks my 60th year as a radio amateur, and my 50th year as Propagation Editor of *CQ* magazine. And now this award, whose brightness I will enjoy basking in.

Tonight I am still on cloud nine. Don't get emotional, my wife warned. But I have benefitted so much from amateur radio personally, fraternally, and professionally over the past 60 years that I feel guilty being given an award for something that has done so much for me and that I enjoy doing. I have been rather successful professionally in telecommunication engineering. I have received my share of awards over the years, but this one is very special. This is truly the icing on a very tasty cake.

It is special because so much of my daily life, for so long a time, has been entwined knowingly or unknowingly with amateur radio. It was the spark that as a teenager ignited my passion for communications. It has provided

George, W3ASK, admiring his 2001 Radio Amateur of the Year award.

the fuel that has sustained that interest to this day. Like many of you, some of my closest and dearest friendships, in all parts of the world, developed from the amateur radio connection.

I want to thank the Dayton Amateur Radio Association for this award, which I accept gratefully and humbly. I want to thank Cathi Hoskins and the members of the DARA for the gracious hospitality shown to my wife and I this marvelous weekend in Dayton.

I also want to give special thanks to my XYL Bea, and to those many other technology-disinterested mates who have endured amateur radio without a complaint, and often with an understanding smile and a helpful hand despite the countless hours we may spend keeping schedules with faceless voices around the world, getting up in the middle of the night to catch rare DX or to participate in a DX contest, stopping everything to handle a life-saving phone patch, providing disaster assistance for complete strangers. But isn't this the real magic of amateur radio?

I could go on and on praising the virtues of this passion that we all share, but I see through the corner of my eye the shadow of that hook ready to grab me. So, finally, I want to extend my warmest thanks and gratitude to all of you, my friends, my colleagues, and my peers in the amateur radio community, for this award which I will especially cherish.

Thank you all and 73.

them to peak between 8 AM and noon and again between 6 and 9 PM local time. The occurrence of sporadic-*E* openings should decrease considerably by mid-September.

Trans-equatorial (TE) propagation conditions on 6 meters should begin to improve during August, and some openings may be possible by the end of the month. The best time for these openings is between 8 and 11 PM local daylight time. This type of propagation considerably favors openings from the southern tier states into deep South America, but an occasional opening should also be possible from more northern states.

Meteors

Some minor meteor shower activity is expected during August. Perhaps the best chance for a VHF meteor opening is during the *Perseids* shower, which began during late July but is expected to peak on August 12th. Check at 14 UT and again at 19 UT, when the rate of meteors entering the Earth's atmosphere may be high enough to sustain ionization for VHF openings.

Other minor showers and their dates of expected peak meteor rates are:

South Delta Aquarids—Aug. 4–5
North Delta Aquarids—Aug. 8
North Iota Aquarids—Aug. 12 and 19
Kappa Cygnids—Aug. 17

Aurora

The possibility of aurora activity increases as the Equinox approaches. Some may take place as early as late August and early September. VHF signals can be propagated for distances of

HOW TO USE THE DX PROPAGATION CHARTS

1. Use chart appropriate to your transmitter location. The Eastern USA Chart can be used in the 1, 2, 3, 4, 8, KP4, KG4, and KV4 areas in the USA and adjacent call areas in Canada; the Central USA Chart in the 5, 9, and 0 areas; the Western USA Chart in the 6 and 7 areas; and with somewhat less accuracy in the KH6 and KL7 areas.

2. The predicted times of openings are found under the appropriate meter band column (10 through 80 meters) for a particular DX region, as shown in the left-hand column of the charts. An * indicates the best time to listen for 160 meter openings.

3. The propagation index is the number that appears in ( ) after the time of each predicted opening. The index indicates the number of days during the month on which the opening is expected to take place as follows:

(4) Opening should occur on more than 22 days
(3) Opening should occur between 14 and 22 days
(2) Opening should occur between 7 and 13 days
(1) Opening should occur on less than 7 days

Refer to the "Last Minute Forecast" at the beginning of this column for the actual dates on which an opening with a specific propagation index is likely to occur, and the signal quality that can be expected.

4. Times shown in the charts are in the 24-hour system, where 00 is midnight; 12 is noon; 01 is 1 A.M.; 13 is 1 P.M., etc. Appropriate *daylight* time is used, not GMT. To convert to GMT, add to the times shown in the appropriate chart 7 hours in PDT Zone, 6 hours in MDT Zone, 5 hours in CDT Zone, and 4 hours in EDT Zone. For example, 14 hours in Washington, D.C. is 18 GMT. When it is 20 hours in Los Angeles, it is 03 GMT, etc.

5. The charts are based upon a transmitted power of 250 watts CW, or 1 kw, PEP on sideband, into a dipole antenna a quarter-wavelength above ground on 160 and 80 meters, and a half-wavelength above ground on 40 and 20 meters, and a wavelength above ground on 15 and 10 meters. For each 10 dB gain above these reference levels, the *propagation index* will increase by one level; for each 10 dB loss, it will lower by one level.

6. Propagation data contained in the charts has been prepared from basic data published by the Institute for Telecommunication Sciences of the U.S. Dept of Commerce, Boulder, Colorado 80302.

August 15 to September 15, 2001
Time Zone: EDT (24-Hour Time)
EASTERN USA TO:

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Central Europe & North Africa	09-15 (1)	08-10 (1) 10-15 (2) 15-18 (3) 18-19 (2) 19-20 (1)	09-15 (1) 15-16 (2) 16-18 (3) 18-23 (4) 23-03 (3) 03-05 (2) 05-07 (3) 07-09 (2)	19-20 (1) 20-21 (2) 21-22 (3) 22-01 (4) 01-02 (3) 02-03 (2) 03-04 (1) 20-21 (1)* 21-22 (2)* 22-00 (3)* 00-01 (2)* 01-03 (1)*
Northern Europe European CIS	12-15	08-10 (1) 10-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	09-14 (1) 14-16 (2) 16-19 (3) 19-20 (2) 20-22 (1) 22-01 (2) 01-06 (1) 06-09 (2)	20-21 (1) 21-22 (2) 22-00 (3) 00-01 (2) 01-03 (1) 21-02 (1)*
Eastern Mediterranean & Middle East	12-16 (1)	08-10 (1) 10-13 (2) 13-16 (4) 16-18 (3) 18-19 (2) 19-20 (1)	07-09 (2) 09-16 (1) 16-17 (2) 17-20 (3) 20-23 (4) 23-00 (3) 00-02 (2) 02-07 (1)	19-21 (1) 21-00 (2) 00-01 (1) 22-00 (1)*
Western Africa	12-17 (1) 17-19 (2) 19-20 (1)	08-10 (1) 10-15 (2) 15-17 (3) 17-21 (4) 21-23 (3) 23-01 (2) 01-03 (1)	13-16 (1) 16-17 (2) 17-19 (3) 19-02 (4) 02-04 (3) 04-06 (2) 06-09 (1)	19-21 (1) 21-02 (2) 02-03 (1) 22-01 (1)*
Eastern & Central Africa	16-17 (1) 17-19 (2) 19-20 (1)	09-12 (1) 12-15 (2) 15-17 (3) 17-19 (4)	13-16 (1) 16-18 (2) 18-19 (3) 19-22 (4) 19-20 (3) 20-21 (2) 21-22 (1)	21-01 (1) 22-00 (3) 00-02 (2) 02-05 (1)
Central & South Asia	10-12 (1) 20-22 (1)	09-10 (1) 10-12 (1) 12-13 (1) 18-20 (1) 20-22 (2) 22-23 (1)	07-08 (1) 08-10 (2) 10-12 (1) 18-20 (1) 20-22 (2) 22-02 (1)	06-08 (1) 20-22 (1)
Southern Africa	09-11 (1) 11-15 (2) 15-17 (1)	08-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-08 (2) 08-15 (1) 15-18 (2) 18-21 (3) 21-22 (2) 22-00 (1) 00-03 (3) 03-04 (2) 04-06 (1)	21-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)*
Southeast Asia	18-21 (1)	09-12 (1) 12-16 (2) 16-19 (1) 19-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-12 (1) 19-21 (1) 21-23 (2) 23-02 (1)	06-08 (1)
Far East	18-20 (1)	09-11 (2) 16-18 (1) 18-20 (2) 20-22 (1)	17-20 (1) 20-22 (3) 22-00 (2) 00-05 (1) 05-06 (2) 06-08 (3) 08-10 (2) 10-12 (1)	05-08 (1)
South Pacific & New Zealand	09-14 (1) 14-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	09-10 (1) 10-12 (2) 12-16 (1) 16-18 (2) 18-19 (3) 19-21 (4) 21-22 (3) 22-23 (2) 23-01 (1)	14-20 (1) 20-22 (2) 22-01 (3) 01-04 (4) 04-05 (3) 05-06 (2) 06-09 (3) 09-10 (2) 10-12 (1)	01-02 (1) 02-03 (2) 03-06 (3) 06-08 (2) 08-09 (1) 03-05 (1)* 05-07 (2)* 07-08 (1)*
Australasia	09-11 (1) 16-18 (1) 18-20 (2) 20-22 (1)	09-10 (1) 10-11 (2) 11-12 (1) 16-18 (1) 18-20 (2) 20-22 (3) 22-23 (2) 23-00 (1)	05-08 (2) 08-10 (3) 10-12 (2) 12-17 (1) 17-19 (2) 19-22 (1) 22-01 (2) 01-05 (4)	03-04 (1) 04-07 (2) 07-08 (1) 05-07 (1)*
Caribbean, Central America & Northern Countries of South America	09-11 (1) 11-13 (2) 13-15 (3) 15-18 (4) 18-19 (2) 19-21 (1)	07-08 (1) 08-09 (2) 09-12 (4) 12-14 (3) 14-21 (4) 21-22 (3) 22-23 (2) 23-01 (1)	06-07 (3) 07-10 (4) 10-11 (3) 11-15 (2) 15-17 (3) 17-03 (4) 03-05 (3) 05-06 (2)	19-20 (1) 20-21 (2) 21-23 (3) 23-03 (4) 03-05 (3) 05-06 (2) 06-07 (1) 22-23 (1)* 23-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina, & Uruguay	08-10 (1) 10-12 (2) 12-14 (1) 14-16 (2) 16-17 (3) 17-18 (4) 18-19 (3) 19-20 (2) 20-21 (1)	07-08 (1) 08-11 (2) 11-15 (1) 15-16 (2) 16-18 (3) 18-22 (4) 22-00 (3) 00-01 (2) 01-02 (1)	10-16 (1) 16-18 (2) 18-19 (3) 19-02 (4) 02-04 (3) 04-07 (2) 07-09 (3) 09-10 (2)	20-21 (1) 21-22 (2) 22-03 (3) 03-05 (2) 05-07 (1) 22-00 (1)* 00-04 (2)* 04-06 (1)
McMurdo Sound, Antarctica	16-17 (1) 17-18 (2) 18-19 (1)	12-17 (1) 17-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	16-19 (1) 19-22 (2) 22-02 (3) 02-05 (2) 05-08 (1) 07-09 (1)	01-05 (1)

Time Zones: CDT & MDT (24-Hour Time)
CENTRAL USA TO:

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Southern Europe & North Africa	10-13 (1)	09-10 (1) 10-12 (2) 12-16 (3) 16-17 (2) 17-18 (1)	08-13 (1) 13-16 (2) 16-17 (3) 17-21 (4) 21-23 (2)	19-21 (1) 21-22 (2) 22-00 (3) 00-02 (2) 02-03 (1)
Northern & Central Europe & European CIS	11-13 (1)	09-10 (1) 10-13 (2) 13-15 (3) 15-16 (2) 16-17 (1)	01-06 (1) 06-09 (2) 09-12 (1) 12-15 (2) 15-18 (3) 15-18 (3) 18-19 (2) 19-22 (1) 22-01 (2)	19-20 (1) 20-00 (2) 00-02 (1) 21-00 (1)*
Eastern Mediterranean & Middle East	11-13 (1) 15-17 (1)	10-12 (1) 12-14 (2) 14-16 (3) 16-17 (2) 17-18 (1)	06-07 (1) 07-09 (2) 09-16 (1) 16-18 (2) 18-22 (3) 22-00 (2) 00-02 (1)	20-23 (1) 21-22 (1)*
Western Africa	10-14 (1) 14-17 (2) 17-18 (1)	07-10 (1) 10-13 (2) 13-15 (3) 15-19 (4) 19-21 (3) 21-23 (2) 23-00 (1)	13-15 (1) 15-17 (2) 17-20 (3) 20-00 (4) 00-02 (3) 02-04 (2) 04-06 (1)	19-22 (1) 22-00 (2) 00-01 (1) 22-00 (1)*
Eastern & Central Africa	14-16 (1) 16-18 (2) 18-19 (1)	10-14 (1) 14-15 (2) 15-16 (3) 16-17 (4) 17-18 (3) 18-19 (2) 19-20 (1)	13-15 (1) 15-18 (2) 18-19 (3) 19-21 (4) 21-23 (3) 23-00 (2) 00-02 (1)	20-00 (1)
Southern Africa	09-11 (1) 11-13 (2) 13-15 (1)	08-09 (1) 09-11 (2) 11-12 (3) 12-14 (4) 14-15 (3) 15-17 (2) 17-18 (1)	06-08 (2) 08-15 (1) 15-16 (2) 16-19 (3) 19-21 (2) 21-23 (1) 23-03 (2) 03-06 (1)	20-21 (1) 21-23 (2) 23-00 (1) 21-00 (1)*
Central & South Asia	09-11 (1) 19-21 (1)	08-09 (1) 09-10 (2) 10-11 (1) 18-19 (1) 19-21 (2) 21-23 (1)	06-07 (1) 07-09 (3) 09-10 (2) 10-11 (1) 17-19 (1) 19-22 (2) 22-02 (1)	05-08 (1) 19-21 (1)
Southeast	12-14 (1) 17-19 (1)	08-09 (1) 09-12 (2) 12-16 (1) 16-18 (2) 18-20 (3) 20-21 (2) 21-22 (1)	06-07 (1) 07-09 (2) 09-13 (1) 18-20 (1) 20-23 (2) 23-00 (3) 00-01 (2) 01-02 (1)	05-08 (1)
Far East	16-20 (1)	08-10 (1) 13-15 (1) 15-17 (2) 17-18 (3) 18-20 (4) 20-21 (3) 21-22 (2) 22-23 (1)	19-22 (1) 22-23 (2) 23-01 (3) 01-03 (2) 03-06 (1) 06-07 (2) 06-09 (3) 09-11 (2) 11-13 (1)	03-06 (1) 06-07 (2) 07-08 (1) 06-07 (1)*
South Pacific & New Zealand	10-12 (1) 12-17 (2) 17-18 (3) 18-19 (4) 19-20 (3) 20-21 (2) 21-22 (1)	07-11 (1) 11-17 (2) 17-19 (3) 19-21 (4) 21-22 (3) 22-00 (2) 00-02 (1)	07-09 (4) 09-10 (3) 10-13 (2) 13-18 (1) 18-20 (2) 20-22 (3) 22-02 (1) 02-04 (3) 04-07 (2)	23-00 (1) 00-01 (2) 01-04 (3) 04-06 (4) 06-07 (2) 07-08 (1) 23-01 (1)* 01-05 (2)* 05-06 (3)* 06-07 (1)*
Australasia	09-11 (1) 15-17 (1) 17-18 (2) 18-19 (3) 19-20 (2) 20-21 (1)	09-11 (2) 14-15 (1) 15-17 (2) 17-19 (1) 19-20 (2) 20-21 (4) 21-22 (3) 22-23 (2) 23-00 (1)	07-09 (4) 09-10 (3) 10-13 (2) 13-19 (1) 19-22 (2) 22-00 (3) 00-03 (4) 03-05 (3) 05-07 (2)	02-04 (1) 04-05 (2) 05-07 (3) 07-08 (1) 04-05 (1)* 05-06 (2)* 06-07 (1)*
Caribbean, Central America &	09-11 (1) 11-13 (2) 13-15 (3) 15-17 (4)	07-08 (1) 08-09 (2) 09-12 (4) 12-14 (3)	07-10 (4) 10-12 (3) 12-15 (2) 15-17 (3)	19-20 (1) 20-21 (2) 21-23 (3) 23-02 (4) 23-01 (1) 04-06 (1) 06-08 (2)	20-22 (1)* 22-00 (2)* 00-02 (1)*

Northern Countries of South America	17-18 (2) 18-19 (1)	14-20 (4) 20-22 (3) 22-23 (2) 23-01 (1)	17-01 (4) 01-03 (3) 03-05 (2) 05-07 (3)	02-05 (3) 05-06 (2) 06-07 (1) 20-22 (1)* 22-05 (2)* 05-06 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	07-08 (1) 08-13 (2) 13-15 (3) 15-18 (4) 18-19 (2) 19-20 (1)	07-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-17 (3) 17-21 (4) 21-23 (3) 23-00 (2) 00-01 (1)	10-15 (1) 15-17 (2) 17-18 (3) 18-01 (4) 01-03 (3) 03-06 (2) 06-08 (3) 08-10 (2)	19-20 (1) 20-21 (2) 21-02 (3) 02-03 (2) 03-05 (1) 20-22 (1)* 22-02 (2)* 02-03 (1)*
McMurdo Sound, Antarctica	11-15 (1) 15-18 (2) 18-19 (1)	10-15 (1) 15-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	16-18 (1) 18-20 (2) 20-02 (3) 02-04 (2) 04-07 (1) 07-09 (2) 09-10 (1)	00-04 (1) 04-06 (2) 06-07 (1)

Time Zones: CDT & MDT (24-Hour Time) Western USA TO:

To:	*10 Meters*	*15 Meters*	*20 Meters*	*40/80 Meters*
Western & Southern Europe & North Africa	11-13 (1)	08-09 (1) 09-12 (2) 12-14 (1) 14-15 (2) 15-16 (1) 22-00 (1)	00-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-19 (3) 19-22 (2) 22-00 (3)	19-21 (1) 21-23 (2) 23-00 (1) 22-23 (1)
Central & Northern Europe & European CIS	*Nil*	07-09 (1) 09-11 (2) 11-13 (1) 13-14 (1) 14-16 (1) 22-00 (1)	12-14 (1) 14-16 (2) 16-17 (3) 17-23 (2) 23-01 (1) 06-08 (2) 08-09 (1)	19-23 (1)
Eastern Mediterranean & Middle East	*Nil*	07-09 (1) 09-11 (2) 11-13 (1) 13-14 (2) 14-15 (1) 22-00 (1)	12-15 (1) 15-17 (2) 17-19 (3) 19-23 (2) 23-01 (1) 06-08 (1)	20-22 (1)
Western & Central Africa	10-13 (1) 13-16 (2) 16-17 (1)	08-11 (1) 11-13 (2) 13-17 (3) 17-19 (2) 19-20 (1)	13-15 (1) 15-17 (2) 17-19 (3) 19-21 (4) 21-23 (3) 23-03 (2) 03-08 (1)	21-23 (1)
Eastern Africa	13-16 (1)	09-13 (1) 13-15 (2) 16-17 (3) 17-18 (2) 18-19 (1) 00-02 (1)	13-16 (1) 16-18 (2) 18-21 (3) 21-23 (2) 23-00 (1)	*Nil*
Southern Africa	09-11 (1) 11-13 (2) 13-15 (1)	08-10 (1) 10-12 (2) 12-14 (1) 14-15 (2) 15-16 (3) 16-17 (2) 17-18 (1)	13-15 (1) 15-17 (2) 17-20 (3) 20-22 (2) 22-00 (3) 00-02 (2) 02-06 (1) 06-08 (2) 08-10 (1)	19-21 (1) 21-22 (2) 22-23 (1) 21-22 (1)*
Central & South Asia	17-19 (1)	08-09 (1) 09-11 (2) 11-13 (1) 16-18 (1) 18-21 (2) 21-23 (1)	06-07 (1) 07-09 (3) 09-11 (1) 19-21 (1) 21-23 (2) 23-01 (1)	05-07 (1) 17-19 (1)
Southeast Asia	16-19 (1)	09-10 (1) 10-12 (3) 12-13 (3) 13-16 (1) 16-19 (2) 19-21 (3) 21-22 (2) 22-23 (1)	23-01 (1) 01-02 (2) 02-04 (3) 04-07 (2) 07-09 (3) 09-11 (2) 11-14 (1)	03-07 (1)
Far East	12-14 (1) 14-16 (2)	09-10 (1) 10-12 (2)	19-21 (1) 21-23 (2)	01-02 (1) 02-03 (2)
	16-18 (1)	12-15 (1) 15-17 (2) 17-19 (3) 19-21 (4) 21-22 (2) 22-23 (1)	23-01 (3) 01-04 (4) 04-05 (2) 05-06 (1) 06-08 (2) 08-10 (3) 10-12 (2) 12-14 (1)	03-05 (3) 05-06 (2) 06-07 (1) 03-06 (1)*
South Pacific & New Zealand	10-13 (1) 13-15 (2) 15-18 (3) 18-20 (4) 20-21 (2) 21-22 (1)	08-10 (1) 10-12 (3) 12-15 (2) 15-18 (3) 18-22 (4) 22-00 (3) 00-02 (2) 02-03 (1)	07-09 (4) 09-11 (3) 11-13 (2) 13-17 (1) 17-19 (2) 19-21 (3) 21-03 (4) 03-05 (3) 05-07 (2)	22-23 (1) 23-00 (2) 00-03 (3) 03-06 (4) 06-07 (3) 07-08 (1) 23-01 (1) 01-06 (2)* 06-07 (1)*
Australasia	13-15 (1) 15-18 (2) 18-20 (3) 20-21 (1) 21-22 (1)	07-08 (1) 08-10 (2) 10-17 (1) 17-19 (2) 19-21 (3) 21-23 (4) 23-00 (3) 00-03 (1)	12-20 (1) 20-22 (2) 22-23 (3) 23-04 (4) 04-06 (3) 06-08 (2) 08-10 (3) 10-12 (2)	23-01 (1) 01-02 (2) 02-06 (3) 06-07 (2) 07-08 (1) 01-03 (1)* 03-05 (2)* 05-06 (1)*
Caribbean, Central America & Northern Countries of South America	09-11 (1) 11-12 (2) 12-14 (3) 14-16 (4) 16-17 (2) 17-18 (1)	07-08 (1) 08-09 (2) 09-14 (3) 14-19 (4) 19-20 (3) 20-22 (2) 22-00 (1)	06-08 (4) 08-11 (3) 11-15 (2) 15-18 (3) 18-04 (4) 04-06 (3)	19-21 (1) 21-01 (3) 01-03 (2) 03-05 (3) 05-06 (2) 06-07 (1) 20-22 (1)* 22-04 (2)* 04-05 (1)*
Peru, Bolivia, Paraguay, Brazil, Chile, Argentina & Uruguay	09-11 (1) 11-13 (2) 13-14 (3) 14-16 (4) 16-17 (3) 17-18 (2) 18-19 (1)	06-08 (1) 08-10 (2) 10-13 (1) 13-15 (2) 15-16 (3) 16-22 (4) 22-23 (3) 23-00 (2) 00-01 (1)	09-15 (1) 15-17 (2) 17-18 (3) 18-01 (4) 01-02 (3) 02-06 (2) 06-08 (3) 08-09 (2)	20-21 (1) 21-00 (2) 00-02 (1) 02-04 (3) 04-05 (2) 05-06 (1) 22-01 (1)* 01-03 (2)* 03-05 (1)*
McMurdo Sound, Antarctica	13-15 (1) 15-17 (2) 17-19 (1)	12-16 (1) 16-18 (2) 18-20 (3) 20-22 (2) 22-00 (1)	09-11 (1) 17-19 (1) 19-20 (2) 20-01 (3) 01-03 (2) 03-04 (1) 06-08 (2)	22-23 (1) 23-01 (2) 01-04 (1) 04-06 (2) 06-07 (1)

*Indicates best time to listen for 80 meter openings.
For 12 meter openings, interpolate between 10 and 12 meter openings.
For 17 meter openings, interpolate between 15 and 20 meter openings.
For 30 meter openings, interpolate between 40 and 20 meter openings.
Best times for 6 meter openings, check 10 meter openings with ratings of (4).

up to 1200 miles or so by reflection from ionized patches produced by aurora activity. Aurora displays are most likely to occur during August and early September when conditions are Below Normal or Disturbed on the HF bands. Check the Last-Minute Forecast at the beginning of this column for those days during the month that are expected to be in these categories.

For a more detailed discussion of VHF propagation conditions, see the "VHF Plus" column by N6CL each month in *CQ*.

Annual Ionosphere Salting

During early June, as this is being written, I am making plans for my annual "salting of the ionosphere" in preparation for the 2001 CQ WW DX Contest weekends. This year it will be in Montreal during the last week of August. This will coincide with the first meeting in North America of the High Frequency Coordination Conference (HFCC). The HFCC is an arm of the International Telecommunications Union and is responsible for coordinating the seasonal broadcast schedules of the world's HF, or shortwave, broadcasters, and resolving cases of potential interference, called *collisions*. The Montreal meeting will coordinate the 2001 winter season schedules.

The HFCC meeting will give me the opportunity to again meet with an old friend whose name should be familiar to many readers of *CQ*. He is Professor Jerzy Ostermond-Tor, the real guru of HF propagation. He is bringing a special bag of salt from the Salzburg mines for the occasion.

There is no scientific explanation for why this ritual, conducted in many parts of the world over the past dozen or so years, has resulted in good propagation conditions during the CQ WW DX Contest weekends. Judging from contest results, however, it appears to have considerable merit.

We hope that this year's mythical tribute will again influence Mother Nature to cast her brilliance for a strong ionosphere during the 2001 CQ WW DX Contest weekends. 73, George, W3ASK

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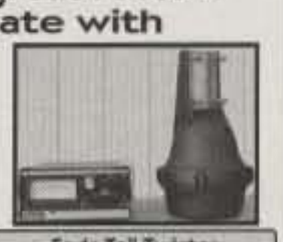
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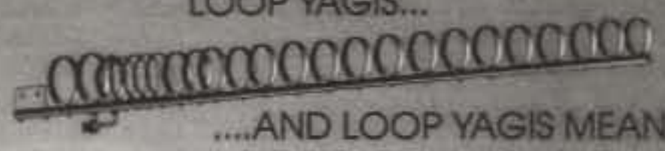
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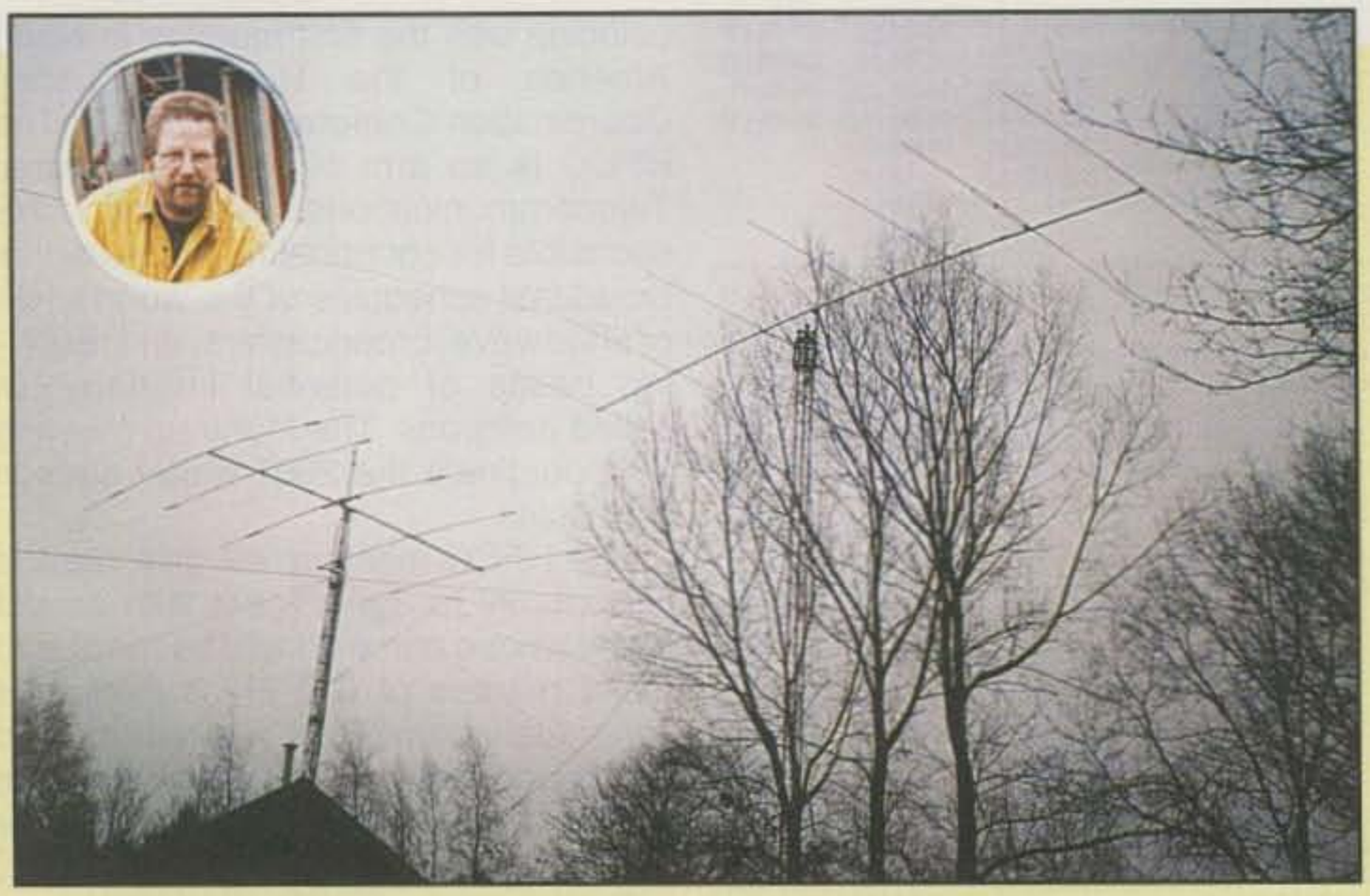

The 7-element 10 meter antenna and 5-element tribander of PAØIJM, #1 Netherlands.

It was our last chance to win M6T in this century, hi. CU next year...***RW2F***. Do not like M/S stations who are transmitting CW or just their call and refuse to answer our calls declaring they are mult station. Many times they are mult for us...***S5ØA***. We think that CQing on the mult radio in M/S is *not* allowed...***S5ØQ***. I was preparing quite a lot for the contest as I installed a new logging program. Everything worked okay. Too bad conditions went down from Saturday to Sunday... ***S53M***. This was the first major contest I participated in and also the first time my fresh contest callsign SM5S was used, as well as the contest computer program TR Log. Although I have been a radio amateur since 1987, I passed the CW examination in April 1999 and first then got the permit to operate on HF. However, due to other circumstances, I became *de facto* active on HF in November 1999. This means that I have been operating on HF bands for about a year. I am not quite sure to which contest class I belong. Am I a Rookie or not? Anyway, I was a single operator, meaning that I was in the shack alone, nobody helped me with operation of the equipment, nor did anybody supply me with food, drink, or anything else. However, I did hear some big stations on the bands tell that they were active on frequency so and so on the other bands. The power used was 100 watts. A notebook with the program TR Log was also used. The operation started Saturday 1920Z and ended Sunday 2400Z. During that time I had two major pauses, total resting time estimated to about three hours. This means that I had been operating for about 25 hours. This was the first time you heard of me, but it will not be the last time...***SM5S (Op. SM5SIC)***.

Great opening on 10m long path on 2nd day...***SV1DKR***. Thanks to *all* who calling me! Good luck in CQ WW CW!...***UPØF***. Conditions were fantastic on 10m. Biggest thrill was when I was called by a VK station. Could hardly believe it with my low power. QRP contesting is tough but very rewarding and fun. Keep up the great work. See you next year... ***VA3SB***. Great contest. Had a blast on 40m. Slept thru the only major Eu opening on 10m & 15m Saturday morning. Oh well...***VA7DX***. As usual a great contest. Also as usual too many distractions and others intruding on my contesting time. There's always next year... ***VE1JS***. Conditions were sure one way during a good part of the contest. I could hear them okay but just couldn't make it back to the DX...***VE4IM***. Probably everyone noticed the solar storm with the incredible auroral flutter that arrived toward the end of Day 1. Things had been great until then, but ... Can we take the first 24 hours and just double that score?...***VE5RI***. Next time I will read how long the contest runs. I was under the impression that it was *only* 24 hour contest and *not* a 48 hour contest. Wife was happy only 24 hours, but my mistake. Tried out some new software programs and had a power bump during contest which made things interesting. Needed to do major editing as system clock went wonky. At least my log can be used for checking... ***VE7FCO***. 100% S&P. How about a category for this?...***VE7XF***. Unreal 10m condx for first 24 hours. Band never shut at VK4....***VK4UC***. Conditions were fantastic!...***VR2BG***. This was my first ever contest... ***VY1MB***. High band conditions were fabulous...***P4ØW (Op. W2GD)***. Working our 3rd dogs back empty bottle DX contest was a great pleasure...***DJ1YH***. All QSOs made in S&P mode—too many Eu QSOs...***F5BEG***. Special thanks to the Jersey Amateur Radio Society for the use of their station...***GJ1Y***. I enjoyed CQ WW phone...***JA4XHF***. This was my first attempt at such a competition and I really enjoyed it!! My xcver is an Alinco DX70 running 100 watts and my antenna is an end-fed 132 foot long wire running NE>SW. In other words a quite primitive operation!!...***MM5AJW***.

Nice contest and good propagation in general. It is a pity our 4/4 cubical quad was broken by the wind before the 15m operation...***F5KBA***. The health situation did not permit me to join my friends at PI4COM. I had fun playing around with the limited home situation...***PA1AW***. The dipole at 20 ft. is not a DX buster so I pulled out the 80m ell from Field Day. Not a lot better but it helped...***VE3OIL***. Great fun! My first CQ WW contest!...***VK3MS***. My QTH is in the Hungarian Embassy in Jakarta...***YBØAVK***. The gales didn't get us, but the rain did. We had to close down with water pouring through the roof!...***M1P***. Causing too much TVI; shut down...***ZS6HO***. I dedicated this contest operation to my departed friend Stephen, 8P8CV...***8P6SH***. Number 1 contest in the world. I like to work in DX contests...***9A2KO***. As usual Eu stations (MM) are running excessive power (2–2.5 KW)...***GW4PD***. Very good contest. High winds and rain so could not put antennas to full height...***M2G***. Great contest, superb conditions the first day, good fun...***VE3ZZ***. Enjoyed the contest even though my area was directly hit by a typhoon during the contest, leaving only 2.5 antennas working...***4F3XX***. First time participated in the QRPp category. Vy hard 2 QSOs! Cu on my love 10m band!...***7K2PBB***. Great conditions on 10m!...***DF1ZN***. 1971: My first contest, was DM5SI, now I am an old man, hi....***DH5AO***. Had my fun. A friend of mine used my home station which causes some trouble....***CT3/DJ6QT***. Another very enjoyable contest. No voice keyer so keeping the drugstore in profit buying up throat lozenges. Aurora on Saturday night made Sunday an endurance ordeal to get those QSOs. Very difficult to RX in Eu due to very QRO and *wide* sigs from some European countries. I *do not* believe for a second these guys are operating within their license conditions. C'mon guys, how about playing it straight next year...***EI6FR***. A lot of action in all the bands. Some new ones too. Who can ask for more?...***EA6LP***.

Entering the SSB contest was still rather unexpected... ***F6BEE***. First time I worked 40 WAZ zone in contest...***F8BJI***. Antenna mast broke mid-way through day 1. Temporarily fixed...***GØDEZ***. At age 84 did not spend quite so long at mic as in earlier years...***G6QQ***. A very part entry with more emphasis being placed on working new mults and keeping a high QSO rate. All operation was S&P style and was in small sessions ranging from 2 hours to 2 minutes in length. This was due to having to look after my 5 year old son for the weekend... ***GMØCLN***. It's surprising what can be worked with a ground plane and 100w...***GM4OBK***. After a decade of top-ten finishes in the high-power, all-band category, this year I decided to try my luck in the low-power section. It was certainly a challenge, not only lower output but lower antenna too. From midday onwards on Sunday my tower was cranked down to just 25 feet (the southern part of the UK was hit by violent storms, causing major structural damage) but even at the lower height the QTH here plays well, so I was quite pleased with my final score...***GW4BLE***. Really enjoyable contest expedition despite 70 mph winds and aurora overhead. First ever use of GZ prefix...***GZ7V***. Next time we want to get more points...***JA2YKA***. Heard all zones but could not work 35 and 39...***JR4PMX***. I worked the first 12 hours as low power and changed to high because of the poor conditions but at the same time the condx changed. Hi Hi. But the principal was that I enjoyed the test very much...***LU5VV***. Working K5K/KH5K was the thrill of my ham life! The 2nd day band closed to JA/USA...***LA6YEA***. I'm happy breaking two personal scores, plus making 2300 QSOs...***LU4DX***. Very interesting propagation beaming long path. It was a contest to say hello to many of my old friends...***LW8EXF***.

As with last year's contest, it was very hard to work stations from Far East Asia and Oceania due to QRM from East Europe and Russia...***MØBJL***. It was nice to hear the band so busy. I have never heard 10m so open...***M3C***. 50 mph winds and rainstorms made me glad I only had a dipole to worry about... ***MUØFAL***. Great Saturday but then I was hit by visual aurora and first snow...***OH2BH***. Very good contest and perfect operators...***OK2SWD***. A great weekend! Thank you all and see you next year...***PT2AW***. There was following circumstances that did not let me work as I planned to. First: I got all my antennas down just b4 the contest due to extreme bad WX conditions (hurricane has come). Second: My mains power supply was just 180V instead 220V and it was a reason to low power operation. But good news: I received my 5BWAZ Plaque just b4 the contest start and it was really good stimulation to take part in the contest. Thanks a lot to all who came back to my call and hope see again in CW part...***RAØFA***. Power transformer in my xcvr died as I was calling KL7Y:(...***UA4LDP***. It was a big contest with big problems because of electricity...***YT7R***. Thanks for your great contest! This is my first contest!...***UX6F***. IC-756 found dead on eve of the contest. Took to radio hospital and

TEAM CONTESTING

1. **Neiger's Tigers #1: 57,593,286:** GW4BLE, D4A(IV3TAN), HC8A(N6KT), KH7R(CT1BOH), 8P1A(W2SC).
2. **CCF Team Sunshine: 43,143,102:** OHØZ(OH1EH), OH2BH(OH1NOA), EA8AH(OH1RY), OHØBH(OH1WZ), PZ5JR(OHØXX).
3. **Neiger's Tigers #2: 30,260,271:** FS/K4ZA, FS/AH8DX, WP2Z(K6RO), PJ8/K7ZUM, VK5GN.
4. **Neiger's Tigers #3: 22,919,268:** KQ2M, W4AN(N2IC), W9RE, K6NA, W7GG.
5. **Team Aruba: 15,891,426:** P4ØB(P43P), P43E.
6. **Neiger's Tigers #4: 14,026,906:** ZX5J(PP5JR), PY5M(N6TJ), P4ØW(W2GD), V8A(JO1RUR), JY9NX(JM1CAX).
7. **Neiger's Tigers #5: 12,996,493:** VE5ZX, NA2U, KI1G, K8DX, S53R.
8. **Revenge of the Nerds: 12,122,156:** LY6M(LY1DS), OH6XX, S51TA, S5ØC(S55OO), EM3J(UU2JZ).
9. **CCF Aurora Ticklers: 10,667,083:** OH7M(OH4JFN), OH1F(OH1MDR), OH6NIO, OH3RM, OH6RX.
10 **SKY Contest Team 10m: 6,172,640:** OK2RZ, EA9LZ, YT6A, W4ZV.
11. **LUCG #2: 5,845,120:** LU7YS, LW8EXF, LU4DX, K1VUT, LU6EBY(LW9EUJ).
12. **Novi Sad Contest Team: 5,537,120:** YU7WW, YU7QL, 4N7N.
13. **Neiger's Tigers #6: 4,863,257:** K6LA, N6WS, W6TK, KØDU, W2FU.
14. **Beverly Contest Group: 4,761,124:** K1JE, W1NT, W1TE
15. **CCF Aurora Artillerymen: 4,210,107:** OH5BM, OH6AC(OH6CS), OH8L(OH8LQ), OH7A(OH7MA), OH2RA.
16. **LUCG #4: 4,196,829:** LU2EC, LW7EIC, DL8UD, W7GG.
17. **SKY Contest Team Abroad: 3,322,544:** S56A, RZ9HT, G3TMA, RA6LBS.
18. **CCF Aurora Gamblers: 2,152,271:** OH3WW, OHØV(OH6LI), OH3MMM(OH1MM), OH8VJ.
19. **Team Tennessee "Dos": 2,094,556:** K4LTA, W4PA, K4BP, AK4ST, KE4OAR.
20. **Rocky Mountain Low Power Team: 2,081,137:** WØAH/XE3, WØETT.
21. **LUCG #1: 2,033,835:** AY1I(LU7DW), LU5EVK, LW6EQG, LU4DZ, LU1FNH.
22. **Neiger's Tigers #7: 1,980,908:** PP5UA, PP5JD, PQ5W(PP5WG).
23. **Team Tennessee "Uno": 1,754,606:** NN4T, NQ4U, NY4T.
24. **WWYC Team Bravo: 1,478,367:** 9A7P(9A6XX), N4JN.
25. **Team Numero 13: 1,422,397:** EA1MK, EA1CQJ, EA1YB, EA1OT
26. **WWYC Team Alpha: 1,417,839:** OZ1AA, K4UCF(KD4RWN), LZ5AZ, LZ1ABC.
27. **LUCG #5: 665,413:** LU7DR, LW5DX, LW7EGO, LW8ER, LU1HN.
28. **Radio Club Foronda: 455,445:** EC2ADR, EC2AUS, EA2BLK, EA2AVM, EA2CAR.
29. **CCF Team Leisure: 332,346:** SV9/OH4FR, OH2LU.
30. **LUCG #3: 177,741:** LU6FAZ, LU5JKG, LW8DXJ.

then went to New Market fleamarket which was on that weekend and purchased an old Kenwood TS-660 not realizing it was QRP. Was on the air by mid-afternoon to amazing conditions. Worked Reunion and Marshall Is., VK, ZL, Greece, etc. I had to keep checking the external wattmeter to convince myself the rig was throttled back from 10 watts max to QRP 5 watts. Amazing. May go QRP from now on...***VA3HG.*** This was the first contest I worked. I had fun doing it and looking forward to more contests...***VY1MB.*** Needless to say we got hit by the solar storm on the second day like everyone else but we had a good time...***VY2SS.*** It is always fun to work the CQ WW test...***ZS4NS.*** On Sunday the band closed early here for the USA and there was some very rapid and deep QSB from noon onwards...***EI4CF.*** As always a very enjoyable contest. First time as a single operator...***IK4QJM.***

Vertical dipole often much better than TH5!!...***IK5EKB.*** Second time I took part in this contest. It's always a great challenge...***IZ6CUS.*** I am satisfied with my best results...***JH4UYB.*** Another of those very exciting contests! Superb conditions on Saturday...***OT7L.*** This is my first CQ WW DX contest...***T77CD.*** I missed west coast. I thought I heard some stations well. No answer at all...***RA3AQ.*** Great first CQ WW. Not sure that low power was a wise choice...***ZS6VER.*** Problem: TV, my wife, my dog. I'm sorry... ***I8TWB.*** Good contest. Conditions good. 15m sounded more like 20m!...***M2W.*** I had problem with my computer which deleted all my QSOs that were on another band...***9A7D.*** New antenna rotator and cables but very tired after working...***IQ7A.*** 44 hours of ultimate pleasure with CQ WW...***SP5DDJ.*** I operated from just north of Cancun, Quintana Roo, Mexico. Ran 100 watts, an IC-706, to an 25-year-old Hy-Gain 18AVQ 10–80m trap vertical about 30 ft. out on a 70 ft. dock in Caribbean Sea. Used a resonate length of wire averaging 15 ft. above ground on 160m...***XE3/WØAH.*** What a difference using a 15 ft. high dipole instead of stacked Yagis!!...***NH7/N6ND.*** Was visited and interviewed by the Island TV station during the contest just hours...***FP/N8KR.*** Best condx on 10m since I can't remember when. Sadly the amplifier blew up Sunday and I couldn't get the parts to mend it. Just wait for the CW weekend!...***G3UFY.*** Thanks to Rick, ON4IZ, and his lovely wife Mia for their hospitality and fine food...***ON/NØKE.*** I would like to say thanks to my friend Martin (LW5DKY) because he allowed me to use his station during the contest...***LW5DX.*** Next year the first thing to pack is my really irritating alarm clock. The one I bought down there was not loud enough to wake me up! Slept for 5 hours the second night and missed out on the US 40 and 75m runs! Should have had another 600 easy Q's. Antenna broke on 10m Sunday morning; ended up on 15m and 20m all day Sunday and the rates were on 10m! Two things for next year: alarm clock and make sure all the clamps on the antenna are tight and there will be a next year...***FS/K7ZUM.***

USA QRM

Casual contest, great propagation, great time...***NØUU.*** Good year for having fun...***N6IC.*** Conditions were great! 40 was open to Europe and Africa Friday night when Murphy struck. Amp died and radio died. I just shut everything down and went to bed. Installed backup radio next morning and continued without amp. Still had a great time. Highest score ever. Oh the wonders of computer logging...***N6OU.*** My first time to do a single op of *any* kind in this contest...***W5KFT.*** As much fun as you can have with your clothes on!!...***AD6KA.*** Entered Multi-Operator Single Transmitter for first time. Most ops are new to contesting...***AE9B.*** First electronic log. Fingers crossed...***AG4CG.*** Single band too boring; will go all band next year!...***AK6R.*** Done the hard way—100 watts to a GAP Titan-DX all-band vertical antenna!...***KØCF.*** Great conditions while they lasted! I had to stop abruptly on Saturday evening, but I guess I didn't miss as much as I had feared...***K1HT.*** Another very enjoyable weekend. Nice condx. That Saturday evening solar activity made it even more interesting. See you in the CW contest!...***K1IR.*** The peril of multi-band antennas—trying to work 20m with the low-band vertical! Weekend contests highlight the fun and challenges of ionospheric propagation...***K1LI.*** I had a great time operating this year. Had to do a lot of time juggling at home with grandkids, etc.! My goals were 1 million points and 1000 QSOS. Made the 1 mil, but band condx changed a bit on Sunday and I missed the 1000 Q's ! This type of propagation shift only hammers home the point to work those mults ASAP and run 10m as much as possible early on! First time using Writelog and I'm hooked! I'm sure that I'll get more proficient with it as time goes on. I still can't believe that I missed Zone 5 on 80 and 10 meters !!...***K1RV.*** Had a ball with a 3-el/10m Yagi and an R6 vertical. Look out...***K2YSY.***

This year did multi-single with my 10-year-old daughter Sara, KB3CLQ. Had a blast...***K3OO.*** Peaking sunspots sure make it fun... ***K3SA*** *(We will miss you, Steve—ed.).* Phone WAC in 2 hours with 5 watts! Got to love this stuff...***K4FB.*** I had a great time with the contest. It was my first CQ WW but I am sure it is not my last...***K4KJ.*** This is the first time I put in a real effort to be on the air. Had a great time!...***K4RFK.*** I decided to try low power this year and it turned out to be a lot like being a minnow in a shark pool!...***K4WI.*** Due to house construction this was my only antenna. Conditions were not good...***K5ZD/1.*** I invited a bunch of guys from United Radio Amateur Club (URAC/K6AA) to contest. Many of them had never operated from a contest station. I was impressed with the dedication of this bunch. They operate a lot of special events

Zlatko, Z32AM, #1 Macedonia 21 MHz.

and can bang out the Q's. Eventually this group will become a real M/M crew...***K6AA.*** People need to spend more time listening than transmitting. Might make a few more contacts...***K7YAK.*** Was sick at the beginning of the contest and didn't really start until Saturday morning. The bug hit me again and had to take a few more hours off during the morning Eu run. But for my first time doing SOAB in this contest, I'm happy with the results...***K8DX.*** My goal is to beat last year's score, and I did it! But next year is going to be tough...***K8VUS.*** Thanks to N4GN for inviting me to operate at his station for the Y2K CQ WW SSB. Another great learning experience and several new ones added to my DXCC total made it a great weekend! 15m Asia run at the end of the test was incredible!...***K9GX.*** First time doing this contest from home in over 10 years! Sure is a challenge with a dipole and 100 watts from the Black Hole...***K9PG.*** CT 6.26 thinks I am in Palau, CQ Zone 27...***KC6OKU.*** Thanks to all the ops who put up with my low power...***KC7WUE.*** First time working the CQ WW DX Contest. Had a great time with it...***KC8CON.*** Band conditions were strange but still got some good QSOs...***KC8HWV.***

First WW for me in many years; sure felt good to be a part of the fun again...***KD1R.*** This was my first contest. My Dad helped me. It was a lot of fun! Especially talking with all the different countries...***KD7HGV.*** Great propagation from the Pacific. Very few African stations active on 40m. Less DX than last year. Several DX stations would work the ROW stations, simplex, and when they "worked the pile-up down" they would call CQ and then leave. No USA split operation...***KE4SCY.*** Not bad for an attic dipole, 100w, and my first attempt—20 countries I've never talked to before!...***KE4VYZ.*** Saturday was great, Sunday disappointing, but still a best ever score...***KF2O.*** Great band condx! Had too little time to operate. My son started my dual-boot computer on Sunday and Win98 changed the system clock to adjust for daylight savings time. I hope he did this after the contest and not during one of my breaks!...***KF9YR.*** Really my first serious effort. We had a great time. Murphy stopped by a few times, but we worked around him...***KK1L.*** This was my first CQ WW—looking forward to many more ...***KK4TA.*** First time using a computer. Wow!...***KL7FAP.*** The most fun is when the rare ones come out of the woodwork!...***KS7T.*** Fabulous 10m openings on Saturday. Wish we'd had more time to play!...***NØAX/7.*** Too busy this weekend to put in a solid effort. Had fun anyway and picked up a few new ones...***NØHR.*** Enjoyed the contest. Conditions were pretty good except for the flare Sunday morning!...***N1AO.*** *Great conditions,* and who ever thought I'd work an A5 calling CQ in a contest? Best score ever from home....***N1DG.*** It was some fun running QRP in this contest...***N2WG.*** In addition to having a great time operating with more automation than ever, I got to spend a few hours Saturday afternoon working with a couple of new neighbors who received me S9 on their audio gear and TV set. On Sunday morning just as 40m was peaking to the South Pacific and I was about to pounce on New Caledonia, a squirrel decided to dance one last time on the power lines and give me another 4 hour break from the contest...***N3AM.***

Tough contest. First, rotor froze up pointing east. Then rig malfunctioned and had to go with my IC-706 without filters. That was interesting. Made the going really tough. Maybe next year will be better!...***N3KF.*** Great contest! What a difference a higher antenna and an amp make! I don't feel like such a little pistol anymore...***N4EL.*** Are too many participants good? Yes/No – No because I could not find a free frequency to call

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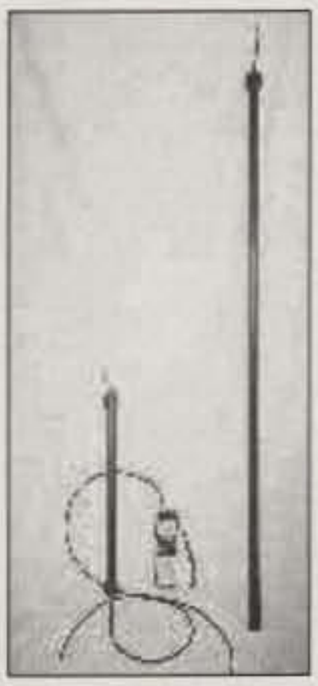
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CQ anywhere!...***N4UH.*** After hustling to get the new tribander stack done, it looks like I have a bad piece of coax, so only the bottom antenna was working. Condx were FB Saturday morning but went down the tubes when the K-index soared. As always on phone, just fooling around...***N4ZR.*** My first CQ WW contest. I loved It. I really enjoyed N3FJP's Logging Software. Will be looking forward to next year!...***N5ASA.*** Lots of fun with so much DX to work. Thanks to everyone for QSOs!...***N5XJ.*** Thunderstorms were real interesting. Shut us down for a couple of hours. Station N5YA worked well. Almost doubled last year's score. Thanks to all who worked us...***N5YA.*** Ran the Kachina 505dsp/Acom 2000a combo via remote. Sure beats antenna restrictions... ***N5ZC.*** Fun contest, even when you do the whole thing on a vertical...***N6DW.*** New Zone 3 record in this category. Tough going with QRP on 40!...***N7IR.*** I couldn't work the whole contest, but this is my best score ever. Last 10m run netted Vietnam and an XU station...***N7UJJ.*** My first CQ WW contest. I "loved" it! After 50 hours trying to work K5K in the pileups, I found him sitting all alone during the contest calling CQ and worked him the first call! I was one happy camper!...***N9KT.*** Only partial effort on Sunday due to bad conditions, but got first "weekend DXCC"...***N9QQK.***

First attempt at real contest operating for me. Much technique to learn and time to commit!...***N9WW.*** I jumped into this as a way to get in some practice with NA before sweepstakes. I guess it kind of ran away with me...***NJ8J.*** New twin boys limited the preparation time for my first contest effort and a new station. Only minutes before the contest started did we have a working logging program, and we never did get the voice keyer working. But a log periodic is an awesome antenna in a contest; don't let anyone tell you otherwise!...***NZ3O.*** Enjoying playing. Didn't have time to be serious but bands were great!...***WØOSK.*** My comments have never been printed, so I won't say anything here...***W2UP.*** Another HP/LP entry from W2ZU. I was on my way to a 1M effort on SSB, not my favorite mode, when the amplifier became a smoke generator. So, I became LP and suffered for it! Well there's CW coming up to soothe my fevered brain....***W2ZU.*** Great conditions and the new tribander stack played great...***W4NF.*** Could use some better antennas but first thing first. Got to get a better chair!...***W4SI.*** This was my first contest and it took two days for my body to physically recover...***W4WTB.*** Got three new countries to increase total to 251 and five new countries to increase Y2K total to 219...***W4YDY.*** Used the NFDXA club call, W4ZR, for this one. Lots of fun. Most of our contesting members were operating VP5DX this contest...***W4ZR.*** First day was 200 Q's ahead of last year's record on 10 but finished 200 below!...***W4ZV.*** Concentrated on working 10m all zones. Excellent conditions except for Asia...***W5BBR.*** It was the best of propagation, it was the worst of propagation, all in one weekend...***W6CN.*** Not too bad for a single op operation using low power (100w) and a vertical antenna...***W6SI.*** Time for another radio or two to become active in the shack...***W7AT.*** New W7 record! Could have been a lot better if 10–15m had not gone gunny sack Sunday...***W7GG.***

Good conditions. Fun to work around the world and make DXCC in one weekend...***W7QF.*** Not like operating from my other QTH at XE2DV but fun to do it from the states...***W7ZR.*** Great conditions. My new antenna, C31-XR at 90 ft., really kicked butt...***W8KEN.*** This was my first CQ WW contest using my new Extra Class privileges, but I still spent a lot of time on 10m! I had a blast running an old Kenwood TS-820 and my homebrew Windom antenna which I put up 29 years ago when I was a first licensed as a Novice. I'll be looking forward to next year's CQ WW Contest...***WA1OFR.*** This was a casual effort, operating somewhere around 18 to 19 total hours, mostly in the day and early evenings of both Saturday and Sunday. My primary interest was in working new countries, but also in working new band-countries, particularly on 15 and 10m. I was able to call CQ only a few times, without much success. All in all, I had a lot of fun....***WM5R.*** A lot of work went into preparing for this contest and it paid off...***WW4M.*** 100w coupled with great condx and good antennas still gets you places...***K1ZM.*** Installed two 295 ft. beverages for 40 meters. I was very pleased with their performance. My score was down from last year. The transmit antennas still need more work. There was an excellent 40m JA opening Sunday 1145–1230Z to W4-land. There were more JA's at one time than I have *ever* heard before! These nice surprises keep you coming back for more...***KD4RH.*** Sunday afternoon not so hot but great time with super conditions on Saturday. Need to definitely improve my 80m antenna. Decided to operate Assisted since I had limited time. Forgot how fun it was to chase mults from the packet cluster. Thanks again to the JA boys who help keep the "Left Coasters" in the ball game...***W6TK.*** Kudos to the JA ops!! They kept the amateur spirit at heart and were true ambassadors while contesting...***AG4CZ.***

I shared the station with my 12-year-old daughter (W6JEN). She entered single band 10m and I did 40m and slept during the day. Maybe next year we will team up with a MS effort. An adventure in futility—40m SSB with 100w and a vertical...***W6YJ.*** Just as in past years everything worked except the operator, which kept crashing...***K1QS.*** Severe line noise in daytime both days hurt effort...***K2YEH.*** Conditions great Saturday, not so good Sunday. Still a personal best...***KF2O.*** Good conditions on 40m early Sunday morning. I picked up five new countries...***W8VE.*** A squirrel shorted the power lines and gave me an unexpected 4 hour break from the contest Sunday morning...***N3AM.*** The two solar flares messed up any chances of DXCC this weekend...***N4UK.*** No opening to Europe on 160 at all; conditions on the bands were great...***W2AX.*** My first contest submission in over two decades...***KB1CJ.*** Fantastic opening to SE Asia the last hour of the contest... ***N4CT.*** First contest. The most fun I've ever had in amateur radio!...***W4WTB.*** Morocco on 40m was a thrill...***KB2EOQ.***

Station Operators
Multi-Op, Multi-Transmitter

3Z1KG: Club. **4U1VIC:** DF6QC, DL1ELY, DL3EL, DL4ABR, DL5XAT, DL5XL. **AA2D &** NM3K. **BY1DX:** OH2BVE, OH2BCP. **CN8WW:** DL8WPX, DK7YY, DL8OH, S5ØS, DL1MAJ, DK6WL, HAØDU, DK4VW, DJ7ED, DL4MCF, DL6RAI, DJ9KV, DL1IAO, DH1SGS, DL2MEH, DL6FBL, DL1MFL, DL1MGB. **DFØHQ:** DH7WW, DL1AUZ, DL2OBF, DL3DXX, DL3OI, DL3TD, DL4ALB, DL5ANT, DL5AXX, DL7VOA. **DL2DBH &** DJ9DZ.**DL3EBB &** DH4JQ, DL2EHP, DF6JC. **E3ØTA:** DL5NAM, DF4RD. **EA3ESJ &** EA3CCN, EA3CKX, EA3EJI. **EA4URE:** EA1JE, EA2TV, EA4BPJ, EA4BT, EA4CT, EA5OW, EA5XX, EA7CRL. **ED1SML:** EA1CP, EA1GY, EA1EVR, EA1EVS, EC1AJS. **ED2URV:** EA2BFM, EA2AIJ, EA2BHE, EA2AJX. **ED4RAX:** EA4ABW, EA4AFA, Montse, Juan. **ED7VG:** EA7HY, EA7ATX, EA7GNC, EA7CCN, EA7CCA. **ES9C:** ES1ABR, ES1DW, ES2NA, ES2QH, ES2RJ, ES5MC, ES5MG, ES5QA, ES5QX, ES5RAH, ES5RN, ES5RW, ES5RY, ES5TV, XE1KK. **EU5F:** EU6DX, EU6EU, EU6FF, EU6TT, EU6TV, EV6C, EV6M, EW6AF, EW6AL, EW6AW, EW6DX, EW6EW, EW6MM, EW6OO, EW6TU. **EY2A:** EY8BA, EY8CQ, EY8MM, EY8WW, EY8XX, AB6BH, K5OT, K6JL, K6MC, N6AA, N6ZZ, W6XD. **GMØB:** GMØEGI, GMØLIR, GMØOQV, GMØEEY, GMØXFK. **GM2T:** MMØDXC, MMØCCC, GM4XZZ, MM1CPP, M5BAP, GM4UYZ, GM7OLQ, GMØRLZ. **GZ7V:** GM3WOJ, GM4YXI, GM4AFF, GM4TXX. **HBØ/HB9AON:** DF1JC, DJ2YE, DK5EZ, DL8DAW, DL8EAQ, HB9DOD, HB9LCW. **HGØHQ:** HA3MY, HA5LN, HA3UU, HA3LI, HG5C TEAM, HA1YA. **HG6N:** HA2NA, HA3OV, HA3NU, HA6DX, HA6ND, HA6NF, HA6NL, HA6NQ, HA6OB, HA6OI, HA6ON, HA6PX, HA9PP, HA9SU, HA8IB, HA9AX, YO5BRZ. **HSØAC:** E2ØGMY, E2ØNVH, E2ØREX, E2ØRRW, E21EIC, HSØ/G3NOM, HSØGBI, HS1CKC, HS6NDK.

IG9A: I4UFH, I4JMY, IK4UPB, I4YSS, I4AVG, I4KLY, I2EOW, IK2NCJ. **IH9P:** IT9WPO, IT9BLB, W7ZB, OK1FUA, I8QLS, IK8ETA, KR7X, W1NA, IT9VDQ, IK2RZP, IK2HKT, IK2CIO, I2IFT, I8ULL. **ISØA:** ISØMYN, ISØGRB, ISØWBT, ISØXDA, ISØXSE. **IU2D:** I2VXJ, IK2QEI, IZ2AAJ, IK4MTF, IK4ZIF, IK4GRF, IK2EGL, IZ2BKC, IW2HAJ, IK2OHG, IK2PZC, IK2PFL, IK4MED, IK2CFH, IK2BHX, S51XO, I2UPG, IK2YQX, IK2EKY. **J3A:** K1EP, K1TH, K1XX, K2DO, K2KQ, N2FF, N2GA, N3MV, W6FC. **J8ØWW:** NO2R, W2EN, WA2VUY. **JA1YPA:** JA1ATK, JA1PEJ, JF1EQA, JF1VST, JH1AEP, JH1FDP, JH6VLF, JK2RCP, JO1CRA, 7K4HMN, 7M3LVM. **JA1ZLO:** JM3CRK, 7N3PZJ, 7N2GHD, JM7WXN, JM4WKT, 7L3CQP, JN7TCY, Kubota, JO2HKQ. **JA2YKA:** JG2LYJ, JL7JRO, JH3FBK. **JA3YBK:** JH3PRR, JG3KIV, JI3OPA, JM3XKG, JH4NMT, JR4ISF, JF4FUF, JP1NWZ, WV9T. **JA5BJC:** JA5BJC, JA5FDJ, JA5JCC, JH5RXS, JR5JAQ, JS1OYN. **JA7YRR:** JA7CXV, JA7FDY, JA7MSQ, JA7OEW, JA7RQE, JA7WND, JH7MEV, JH7MEX, JH7VHZ, JR8BPM, JR7LVA, JE1KCI, JI7HAV, JM7VFK, JJ1XGF, JQ1NBV. **JW5E:** JW5MN, JW7FD, OH2BH, OH2TA. **K1IR &** K1LZ. **K1KI &** K1CC, KM1P, N1IC, N1ND, N7NG, W1RM. **K1TTT &** W1MK, W1TO, KC2FEE/RA9USU, KB1W, NJ1F, N1SR, NT2X, KC2AIY/UR5FBG, F5NMR/KE1IR, K3TD, N9KAU, WA1ZAM. **K2RD &** W1CU, WA1FCN, K2SX. **K3ANS &** WF3H, W3ZL, KC3WX, K3YD, N3VJA, N3EYT, WØRSJ/3. **K3DI &** N3WK, W3OQ. **K3II &** K3TEJ, K3CT. **K3LR &** K3UA, N3RA, KØRF, K8GL, N9RV, W2RQ, WØUA, ND8L. **K3NM:** N3NM, W3CF, K3MQH. **K4WPM &** K4QFF, K4WZ, AK5E, WA4ZJJ, KS4CG, KB4TXS. **K6IDX &** KH8A, W6OAT. **K9NS:** Others. **KB1H:** AA1CE, N1XS, NB1U, KB1DFB, K1EBY, W1TJL, N7PRO, N1BU, LU9AY. **KC1XX &** KB1AWE, AD1C, KD1EA, KC1F, W1FV, K1GQ, KM3T, K6AW. **KL7RA &** AL7IF, AL7MU, KL7AC, KL7TC, NL7Y, N1TX, W5GN. **KL7Y &** KL2A, KL9A, WL7E, KL7FH, WA2GO, K7NT, K1VR, AL7PJ, NL7Z, KL7CC. **KM5TY &** AG5T. **KR1G &** K1RX, KF1V, K1EPJ, WC1M, W1RZF, W1AAX, W3SM.

KV1W & W1CSM, K1MBO, N6RFM, W1NR, KE1FO, K5ZD. **LA1K:** LA1BFA, LA3YKA, LA4OFA, LA4SKA, LA4TKA, LA4VKA, LA5GKA, LA6MGA, LA7UJA, LA8UGA, LA8VJA. **LY7A:** LYR346, LY3IT, Jasiulionis. **M6T:** G4IFB, G4VXE, WW2R, OH6YF, GØIVZ, GØMTN, G4PIO, G4VMM, GØCYB, G4BUO, G4TSH, G4BWP, GØKRL, GØAEV, G4BAH, GØAFH, GØWCW, G7OCD, GØOZS. **N1MD &** KZ1M, KE1LI, KB1VM, K1QUE, N1ROZ, N1GE. **N2RM &** N2RM, KA2AEV, N2AA, N2NC, W2REH. **N3RS &** N3RD, N3ED, N2SR, N3AD, K3WU, N3ZS. **N4TO &** AE4RO, AE4SW, K1KNQ, K1TO, KT3T, K4LQ, K5KG, W4IR, WD4AHZ. **N8KR &** AC8W, K8DD, W8IQ. **NQ4I &** W4DD, AA4LR, WØCN, W4SVO, NE4S, N9HZQ, K4BAI. **OH2U:** OH1JT, OH2BVI, OH2FT, OH2HE, OH2IW, OH2JQS, OH2JTE, OH2LUR, OH2MA, OH2XX, OH5JOC, OH6CT, OH6DD, OH6EI, OH7BX, OH7JR, OH8KXK. **OL5T:** OK1TC, OK1PAT. **OTØA:** DF3TJ, DH5HV, HA1AG, JK3GAD, K1WY, OH2JA, ON1AEI, ON1AWB, ON1CIM, ON1CKE, ON1DJU, ON1DLJ, ON1DQK, ON1DQZ, ON1DRY, ON1DRZ, ON1DSQ, ON1DSS, ON1GL, ON1MAR, ON2AIM, ON2BIG, ON2BJD, ON4AID, ON4AMX, ON4ATW, ON4AWU, ON4AWV, ON4BCB, ON4BCJ, ON4CAT, ON4CBJ, ON4CCL, ON4CCM, ON4CDC, ON4CDE, ON4CGP, ON4CGS, ON4CHO, ON4DB, ON4FI, ON4VT, ON5CD, ON5DH, ON5OT, ON5UM, ON5WL, ON6HZ, ON6PU, ON7AW, ON7NB, ON7YZ, ON9CFB, ONL1Ø116, ONL3246, Daniel, PA1BX, PA3EZL, PA7BT. **OZ5W:** OZ1FTU, OZ1KRF, OZ3W, OZ4AEE, OZ4QA. **OZ5WQ &** OZ1ETA, OZ3J, OZ3ZW. **PI4COM:** PAØRRS, PA3BWD, PA3CAL, PA3EWP, PA5ET, PA7FM.

RKØAXX: RAØAM, RAØALM, RUØAM, RUØAT, RUAFA, RU9MY, RVØAR, RVØAS, RVØAX, RXØAE, UA9MA, UAØANW, RVØAUM, Maxim, Andrej, RVØAM-Silent Key. **RK4LWA:** RA4LFQ, UA4LLH. **RW2F:** RA2FA, RA2FBC, RA4LW, RN2FA, RN4LP, RW4WR, UA2FB, UA2FC, UA2FF, UA2FM, UA2FZ. **RZ3AZO:** RA3AA, RN9XA, RZ3DJ, RZ3FR, RZ3GE, UA9XMG. **SK6D:** SM6FUD, SM6XEI, SH6AEP, SM6WET, SM6WQA. **V26B:** N3BNA, N2ED, N2TK, W2YR, W2UDT, K3OX, WT3Q, WXØB, NM5M, DL6OBQ, N3OC, N5CK. **VB2R:** Club. **VE3EJ &** VA3NA, VA3RU, VA3UZ, VE3EJ, VE3SS, VE3SUN, VE3XN, VA7RR, VE7CC. **VE3SY &** VE3BUC, VE3XA, VE3WG. **VE5RI:** VE5CMA, VE5FA, VE5FF, VE5FN, VE5WI, VE6EZ, VE6FN, Mason. **VE6FI &** Others. **VP2EK:** AC8G, W8GEX, W8ILC. **VP5T:** N2VW, WA2VYA, WA3RHW. **WØAIH/9 &** WØUC, KMØO, KTØR, WRØDK, AAØZZ, K9CYF, KØTG. **W1FJ &** Others. **W2AX &** K2LE, K2UU, K2WR, KS2G, N2QW, VE1XT, W2II, WM2V. **W2CG &** W2NO, K2WJ. **W3LPL &** DL6LAU, K1HTV, W2GG, ND3A, ND3F, WF3J, AI3M. **W3PP &** AA1K, NW3Y, N6ZO, N3HUV, K3FT, N3KW, N3PT, AB1P, JG7AMD. **W4MYA &** WK4Y, WU4G, WX3B, Lilly. **W5KK &** W5KP, N5AW, W6RW, N6MJ, K6AM, DL2SAX, K6HMS, W6HT, N6VHF, N6KI, K6WS, W6VJS. **W6YX:** N6DE, W6LD, N7MH. **W8YY:** KC8NKY, AB8EF, KI8GM, KC8MVD, KC8MVW. **W8ZA &** K3DNE, K8OQL, WD3A. **WW4M &** KS4XG. **YV4A:** YV2IF,

YV3ACZ, YV5AMH, YV5EED, YV4FAA, YV5IQJ, YV5IVB, YV5LMW, YV5LMX, YV5MHX, YV5OBU, YV5OHW. **ZL6QH:** ZL1CN, ZL2AOV, ZL2CA, ZL2BSJ, ZL1AXG, ZL1AZE, ZL2UO, ZL2AMI.

Multi-Op, Single Transmitter

4LØG: 4L2M, 4L1DA, 4L4CR, DL7BO. **8S2F:** SM2HWG, SM2LIY, SM2NOG, SM2ODB, SM2OXB. **9A1CMS:** 9A5AHD, 9A5TR, 9A6KZH, 9A5AVW. **9A2L:** Club. **9A7A:** 9A7V, 9A8A, 9A2ME, 9A3OS, 9A3TR, 9A4PA, 9A4RX, 9A6DM. **9M6AAC:** K7AR, N7NU, W7RR, W7YAQ, N6NZ, G4MJS. **9V1YC &** 9V1BH. **AA5NT &** W5WW, WD5FLK, K4NR, N3BUO. **ABØMV &** AEØQ, NØHF, KCØERX. **AB2DE:** N2KPB, KC2AVE, N2ZAS, KB2IZB. **AE2F &** N2KIM, WR2I. **AF6P:** W1LLY, N6VVY, KC6JYJ, KG6CLJ, KF6CSX, W6DGR, KF6COE, K6NIC, W6APO, KD6IWA. **AH2R:** JI3ERV/NH2C, JG3RPL/N1BJ, JR7OMD/WI3O, KH2/JR8VSE, KH2/JH7QXJ, KH2/JE8KKX. **B4R:** BA4RC, BA4RD, BA4RE, BA4RF, BD4RR, BD5RV/4, BG4REK (YL). **BV2B:** BX2AB, BV2KI, BV2KS, BV2NT, BM2AAL. **C6AGS:** KI6T, KA6WHA. **CE3AA:** XQ3ZW, CE3WDH, CE3WDD. **CE4TA:** CE4ETZ, CE4BQO, CE4FXY, CE4USW, CE4MLN, CE4RWS, CA4WJR, CE4PBB, CE4MLN, CE4MWK. **CE6TC:** CE6DFY, CE6TBN. **CQ9K:** CT3BD, CT3DL, CT3EE, CT3EN, CT3HK, CT3IA, CT3IQ, CT3KU, CU2CE. **CQ9T:** CT3BX, CT3CD, CT3HF, CT3KN. **DFØCG:** DF1JM, DF7JU, DL1EJA, DL5JQ. **DFØSAX:** DL8DYL, DL9DRA. **DF3CB &** DH1TW, DJ1OJ, DJ8QP, DL3NED, DL4GBA, DL4MEH, DL6QW. **DHØDX:** Joe, Rudi. **DJ1YH &** DK5WQ, DL3SR, DL6PK, DL8WO. **DKØDL:** DL3NCI, DL4NER, DL5RDO, DL9NEI. **DLØDX:** DL5KUT, DL6EZ, DL5JS. **DLØGK:** DF6VP, DK1QH, DL1QW, DL1YFF, DL6YEW, DL9LR, DL9YAJ. **DLØML:** DH1UZ, DL2SEU, DL3SDN, DL4SEW, DL9SDO, DH1SAJ. **DLØPAF:** DL1MFQ, DL4RCM, DJØGM. **DL1RYD &** DL2HYH, DF5AN, DL/HB9CRV. **DL2ARD &** DL2AMC, DL3ALI, DL4ALI. **DL7VYL &** DL7UBA, DL7VRO. **DN1MA:** Robert, Markus, DL7MAE (Control Op). **DN1TUX:** DL1EDB, DL3LBA, DL7AOS, DD3KVL, DG6NEK, DG8NGN. **DX1S:** DK3GI, RK3DT.

EA1AXH & EA1AXQ, EA1COE, EA1AYU. **EA1COZ &** EA1EAG, EA1AS. **EA1EEY &** EA1DZW, EA1CS, EA1CUB, EA1BVP, EA1WX. **EA1FCR &** EA1CMF, EB1CHL. **EA1URO:** Club. **EA3RKG:** Club. **EA4ST &** EA4ATI. **EA5ANQ &** EA5GCT. **EA7UR &** EA7ESH, EA7EHC, EC7AJL. **EA8KK &** EA8AVB. **ED1BD:** EA1ALD, EA1BD. **ED1IDT:** Club. **ED2WW:** EA2AZ, EA2MQ, EA2SG, EA2ANW, EA2ATU, EA2BPP, EA2CCG, EA2CMQ, EC2AHS, EC2AZY, Aki, Jesus, Pipe, Roberto. **ED3TR:** EA3CT, EA3GEP, EA3KG, EC3CTR, EC3CVD, UT3ZZ, Julio, EA3GGO. **ED4TD:** Club. **ED4TE:** Club. **ED8WWC:** EA8AXB, EA8DP, EA8BYM, EA8AKN, EA8AZM, EA8NL, EA8AKQ, EA8BPC, EA8IR, EA8AJW, EA8FO, EA8AAG, EA8BYG. **EI9E:** EI9HQ, EI6GF, EI7FJ, EI2FG, EI4HS, EI5FDB. **ES1XQ:** ES1THQ, ES2THY (YL), ES3THP, Andre, Toenu, Meelika (YL). **EX9A:** EX2M, EXØM, EX8W, EX8F, EX8MLE, EX8MDA, EX8MLT. **F5KBA:** F5CWU, F5MOO, F5NFG, FØCYT, F5AOV, F1PJB, Sylvain, Alain. **F5KQN:** Club. **F6BEE &** F6FGZ, F6FVY, F5MZN, F5NLY, F5SNJ, F8CRH. **F6KDF:** F5NOD, F6JJX, F5PXT, F5ROP, F5PYI. **F6KFI:** F5AZM, F8BQL, F8CGL. **F6KFV:** F6DQM, F6CQS, F6BBO, F6DZS. **F8KCF:** F5DJL, F5UAM, F6BGC, F1ADG, F4JLB. **F9FE &** F5NBX, F6CQU, F8BPN, SWL-Jacques, F6HKA. **FG5BG:** W4WX, KR4DA, W9AAZ, N2WB. **FM5BH &** OH2RF, FM5DN, FM5FJ, FM5DS, FM5WD. **FR/N7DD &** FR5DN. **FY5KE &** Others. **GØWIH:** GØTCD, GØTPK, G7KFQ. **G3B:** G8ATD, M1ACI, G8PTP, G3OLY, G4LOO, MØAJF, GØBVW, G8BEG, G4YRF, G4OXD, G4VXT, MØBIK, MØCKA, G4LWA. **G6YB:** G3XSV, GØWKW, MØAXF, G3TKF, G4FKA, M1ORR, M1EBV, M1AAH, M5XXX, G7FFB. **G9O:** G3ZVW, G3WUX, GØDYW, MØBOX, M1CYT, G1GJK, G1LLW, G6IZA, G7TWC, G8OO. **GB3RS:** G4JVG, GØWAT, MØDXR, G3WRO, EA3WC. **GD6IA:** K1EU, K1JB. **GJ1Y:** NØKV, WØDM, GØHHY, KU4CG. **GNØXYZ:** GI4FUE, GI4OYG, GI4NTF, GIØBJH, GI6IXD, GI7VUF, MI1EEM, MI5SPY.

HB2H: HB2CIP, HB9BLQ, HB9CAT, HB9CXZ, HB9FAP, HB9FBD, HB9FBH, HB9FBG, HB9DRH, HB9FBO, HB9BYT, Emanuele. **HB2OK:** HB9DHG, HB9DOS, HB9DQG, HB9FAQ, HB9FBL, HB9FBS, HB9FBT, HBØOCW, HB9ODM. **HG1R:** Club. **I3EJ &** I3VYK, IK3PDD, IK3SCB, IK3SSX, IK3TCH, IK3TCJ, IK3XTY, IZ3CAQ. **I4GAS &** I4AUM, I4GAD. **I4MFA &** IK4WHG, IK4LZH. **II3A:** IV3RAV, IV3HYD, IV3RCH, IV3WQF. **II4M:** I4MES, IK4GRO, IK4RQJ, IK4VET. **IO2L:** I2OKW, IK2DHU, IK2YYE. **IQ2X:** IK2GZU, IK2GSN, IK2SAU, I2CZQ, IK2EAD, IK2BCP, IK2WAD, IW2LLH. **IQ4A:** I4TJE, I4IND, I4IKW, I4EAT, IK4OCT, IK4XQH, IZ4BOY, I4JUB, I4VEQ, IK4MGP, IK4CZF, IK2ULH, IK2QPR, IZ2AHF, IV3YYK. **IQ9K:** IT9KWF, IT9EWG, IT9CYH. **IR3Z:** IN3QBR, IN3QGY, IN3SUI, IN3XUG, IN3ZNR. **IT9ECQ &** IT9FXY, IT9GNG, IT9HBT. **IZØBEE &** IKØZYJ, IKØZYI, IZØCSO, IZØCGP. **IZ6CST &** Others. **JA1YKX:** JO1VVT, JO1VNM, JO1PCT, JH4OWG. **JA2ZJW:** Club. **JA6ZLI:** JL6ELU, JJ6WYS. **JA7YAA:** JE7HLZ, JHØORW, JR7UOL, JHØNZN, JG7PSJ, 7M1JAS, JO7DJT, 7K4SHF. **JE4VVM &** JG4CLV, JH4UHW, JN4FEU. **JHØZHQ:** JH1GNU, JH1SBE, JAØVSH. **JH7AFR &** JA7WME, 7J7ACV, JO7DCZ. **JH7PKU &** JA9SSY, JF2IWL, JO1UKK, JR5KDR. **JI2KVW &** JF2AII, JF2SKV, JF2FIU, JG2ADX, JG2KTZ, JL2PLL. **JI2ZEY:** JA2BY, JA2BIV, JA2BIL, JA2BHJ, JM2CCL, JO2BBC. **JI2ZJS:** JA2AXB, JA2JSF, JH2UVL, JE2HCJ, JG2TSL, JM2RUV. **JJ1ZXE:** Hoya, Ishibashi, Ishihara, Kubota, Maeda. **JJ3YBB:** JA3PJL, JA3FHL, JA3OOK, JH3FQF, JF3EBO, JE6EKC, JS3VEX. **JK6SEW &** JH6QIL, JF6DEA.

KØAB: KØEV, KØMP, KRØU, NØZM, WØNF, WØZA, WJ1R. **KØGEO &** N8AJN. **KØIR &** KCØIRY, KØSV, KØBLR, KCØHSK, WBØTRA, WØMRD. **K1AR &** K1EA, K1DG, K5ZD, N5KO, W4AN. **K1GW &** K1BX. **K1PT &** N2NL. **K1YR &** K1RU. **K1ZR &** W1GQ, KB1SO, N1SNB, KW1DX, K2TE. **K2UA &** K2AXX, N2MG, K2TER. **K2XR &** K2OWR, N2YFH, N2IW. **K2YEH &** K2CDJ. **K3BSA:** K3JLK, KB3CAI. **K4JA &** K9GY, K9JY, WE9V, W4JVN. **K4NO &** KA9EKJ. **K5MR &** K5KA, K5NZ, K5GA, N5RZ, N5TJ, K6NR. **K6AA:** N6RV, WA6SDK, N6UB, KG6BPB, K6NT, W6MO, WBØQPO, N7KFL, WB6ROH, W7IXL, KQ6EA, N6NW, KC7QN, JH1HGC. **K6ZM:** WA6O, K6WG. **K8AZ &** K8LN, K8MR, K8NZ, N8AA, W8AJ, W8KIC, WB8K, WT8C. **K8DAC:** KB8QO, AB8FY, KM8I, K8CQF, K8OT. **K9CU:** K9BF, KB9UWU, W9ADS. **K9QT &** N9LCR, K9NR. **KA1VMG &** N1ZRD. **KA2JEM &** Others. **KD9ST &** KA9SQS, KA9SQR, KB9EXE. **KH7V &** WH7K, K7BUD. **KK1L &** K1KD, WJ1Z. **KX9X &** Others. **LA2Z:** LA3BO, LA6GF, LA6MV. **LA3T:** Club. **LA7G:** LA5QFA, LA6EIA, LA7WCA, LA8AJA, LA9VDA. **LS7N:** LU8NA, LU4NAZ, LU1NDC, LU2NI, LU2NAA, LU1NAF, LU7NN, LU7HBO, LU7HVH, LU4NA, LU6HDF, LU6HCV, Otto & Tom. **LT1F:** LU3FZW, LU1FGE, LU3FP, LU6FQD, LU1FD, LU3FQG, LU1FKR. **LT5H:** LU1HDR, LU2HF, LU4HUG, LU5HY, LU9HIG, LU9HPN, LW4HBR, LW5HBR, LW6HAR, LW9HAB. **LU4DRC:** LU3EUO, LW6DKO, LW1DTZ. **LX9SW:** LX1AQ, LX1RQ, DL1QQ, DK2OY. **LY2IN:** LY2BUU, LY2OM, LY1CO. **LY4ØZZ:** LY2CO, LY2PAJ, LY3BY, LY3MM. **LZ5Z:** LZ1JY, LZ1MS, LZ1UQ, LZ1HST, LZ2CJ, LZ2FI, LZ2FV, LZ2HM, LZ2UU, LZ2DIA, LZ3DJ, LZ3GU, LZ3TI, Vasko, Krassy.

M1P: G3GAF, G3UHU, G4PWA, G4TNB. **M2G:** GØUZF, GØLRE, G4TZR, G1AHM, GØKLP, G4WJR, GØWTM, GØWTD, G3ZRE, GØUCS, GØLBT. **M4U:** GØDVJ, G3YYZ, MØCGE, M1DSY, G4YJQ, G4EYE, G4WHK, G4FTP. **NØAX/7 &** KD7DQO, KD7FWQ, KD7FYX. **NØIJ &** Others. **NØNI &** WØETC, WOØV, WØFLS, KØKD, NØAV, NØAC. **NØUU &** KØDAS, KØWA. **N1LN &** W5MF, K8EP, W5SB, K7LEX, WA5MLT, KK5LD. **N1MM &** N1IXF. **N1ND &** N7NG. **N1RR &** WM1K, KM1P, K5ZD, N1LH, N2PGD. **N1SOH &** W1FM. **N1XL &** K2GH. **N2LBR &** WA1KKM. **N2MM &** KD2P, K2UT, K2PS, N3EA. **N2NU &** WW2Y, K2WI, K2QM. **N2SS &** N2MT. **N8NR &** N9AG, N8BJQ, W8QID, WB9CIF, N8TPS. **N8PR &** AD4Z, W4SAA, W4OV, N4QV, W4SO, WC4H, W4HRA, K4DON. **NE3F &** KS3F, K3ATO. **NK7U &** K7ZO, K7MK, W7ZRC, KK7A, W9LT, AC7GL. **NT4TT &** N4ZIQ, NR7Z, N4GI, KC4SSN, Reilly. **NZ3O &** W3BG. **OA4O:** OA4AHW, OA4BHY, OA4CVT, OA4DJW, OA4DKC, OA4DII, OA4DIX. **OE1A:** Club. **OE2S:** OE2GEN, OE2LCM, OE2MON, OE2VEL. **OE2XPA:** OE2CUM, OE7AJT, OE2MWN. **OE5T:** OE5OHO, OE3GEA, OE5MKM, OE5VBL, OE5MRP, OE5UNO, OE5CMN, DH1NHI, DH1NFL, DL5RMH. **OH1X:** OH3ES, OH3LQK, OH9MM. **OK2KQM:** OK2MTW, OK2SDC, OK2POX. **OK5W:** OK1AEZ, OK1CF, OK1WF, OK1FKD, OK1DDO, OK1JR, OK1JKT, OM3BH. **OL5Q:** OK1HRA, OK1FLC, OK1VSL, OK1INC, OK1AYE, OK1FFU. **OL7R:** OK1ZMS, OK1XUV, OK1WMV, OK1VWK. **OM3A:** OM8AW, OMØWR, OM8AM, OM8DM, OM3CGN, OM8AU, OM3CHL. **OM5M:** OM3RG, OM2RA, OM1KM, OM2IB, OM2KI, OM2KW, OM6NM. **OM7M:** OK2BFN, OM3PA, OM3PC, OM5RM, OM5RW, OM5ZW. **ON6BR:** ON4CGZ, ON4CHL, ON5RA, ON4CBI, ON4CBM, ON4AYL, ON4CFV, ON2BGB. **OR5EU:** ON5GA, DF3TJ, ON9CEG, ON4CFR, ON1KSF. **OTØC:** ON4ACA, ON4AJZ, ON4ALT, ON4AMI, ON4ASW, ON4CEG, ON4CJN, ON7UN, ON9BGP, Dirk. **OTØL:** ON1AFN, ON1DLL, ON1DMO, ON4AEK, ON4AHF, ON4AKL, ON4AST, ON4BN, ON4BR, ON4CAF, ON4CFZ, ON6NL, ON6ZX, ON7YT. **OTØP:** ON5OO, ON6AH, ON6VL, ON7LX, ON7PC, ON7ZV, ON4LAM. **OZ5ESB:** OZ1CWP, OZ1DYI, OZ1INN, OZ4ABH. **OZ9KY:** OZ1DLD, OZ1FKZ, OZ9AAR, OZ1DD.

P3A: RA9JX, RZ9UA, UA9YAB, RZ3TX, RU3DX, UT7QF, UA9UHD. **PA7MM &** PA1XA, PA3AAV, PA3BLS, PA3CEF, PA7MH, PAØCOR. **PI4CC:** PAØCIS, PA3BAG, PA3BSQ, PA3EPD, PBØAIU, PB5KT, PE7GK. **PI4ZWN:** PA3HFJ, PD4JWA, PD3JDM, PA-1Ø5, PD1ABK, PD4AVO, PA-9Ø13, PA-9822. **PY2BM &** PU2NYV. **PY2GEC:** PY2GY, PY2ESZ, PR8RZJ, PU2WFP. **PY2LDS &** Others. **RF9C:** RZ9CO, RA9CKQ, RA9CMO, UA9CIR, UA9FQY, RX9CAZ, UA9CDT. **RI3A:** RK3FM, RK3FT, RA3DKE. **RK3DWH:** RX3DCX, RV3FF, RN3DC, RZ3BY. **RK3DZD:** (Children 14–16 yrs) Alex, Anton, Dmitry. **RK3QWM:** RA3QH, RA3OU, UA3QJJ, RN3QO. **RK3VWC:** Ambroziev, Ignatev. **RK4WWA:** UA4WA, RW4WA, RN4WA, RU4WW, UA4WKK, UA4-Ø95-754. **RK6LZS:** Club. **RK9JWJ:** UA9JMA, UA9JQN, A. Kiktev. **RK9SWF:** RA9ST, RZ9SR. **RU1A:** Club. **RW3WWW:** RW3WW, RA3WBW, RA3WNS, RA3WJ, RA3WML, RA3WRE, RA3WRP, UA3WHS. **RW9C:** UA9CGA, RW9CF. **RW9OWD:** Club. **RW9UWK:** Medvedev, Velizhanin, Pribora. **RX3RXX:** UA3RAR, UA3RJ, RA3RFA, UA3RV. **RZØIWR:** Kolodkin, Poppil. **RZ1AWO:** UA1ACC, RA1ARJ, UA1AQF, UA1-169-1334, R1A-16, Zadvoroshny. **RZ3DZF:** Club. **S5ØQ:** S5ØQ, S56M, S57AL, S57AW. **S51O &** S52P, S52E, S52F, S58Q, S58R, S52TG, S56OAN, S56SHA. **S51SL &** S53FO. **S53S:** S5ØM, S5ØN, S57LWG, S58DX. **SN8V:** SP8GQU, SP8ARY, SP8LBK, SQ8BGJ. **SP3KPN:** SP3GXU, SQ3GJO. **SP3PFR:** SP3MGP, SP3FLR, SP3BMT. **SP5ZCC:** SP5UAF, SP5TAT, SP5LCC, SQ5BPM, SQ5EBL, SP5HGB, SQ5VJB, SQ5EBJ, SQ5HAB, SQ5GRN, SQ5BPT. **SP9KDA:** SP68522, SP6MQO, SP9LJE. **SP9KDU:** SP9AVZ, SQ9FMU. **SP9KJT:** SP6AXW, SP9IKF. **SP9KJU:** Club. **SP9KRT:** SP9ADU, SP9EMI, SQ9FVR.

T9ØE: Club. **TF3IRA:** TF3AO, TF3GB, TF3HP, TF3RJT, TF3VGT. **UF3CWR:** RV3BR, RZ3AZ. **UN4L &** UA9BA. **UPØL:** UN9LW, UN7LAN, UN9LO. **UR4MWU:** URØMM, URØMZ, UR5MB, US5MAX. **US8U:** UY2U, Bahmach, UT5UDG, UT5UBJ, UT5UPN, US-U-153. **UTØAZA:** UT8AL, UT8AS, UT5AZ, UY1AW. **UT7L:** UR4LRG, UR4LTX, UR4LUG, US4LGW, UY5LW, UXØLL. **UU7J:** UU1JA, UU4JDX, UU4JMG, UU4JGR, UU5JBO, UU6JM, UU4JDD, UU8JK, UUØJM, Belka. **UX8IXX:** UX8IX, US8IDV, US8IBS, US8ICA. **V31GC:** KI7WO, AKØA, WØROO, KØOU, KØLW, ACØL. **V6T1:** JA7HMZ, JA7KAC. **V73AX:** V73A, V73AT, V73CW(AC4G), V73GI(K3VN), V73JK, V73UX. **VA3DJL &** VA3BER. **VA3MG &** VE3XL, VA3KA. **VA3SK &** VA3MW, VA3PC, VE3RZ. **VC5C:** VE5DX, VE5MX, VE5SF, VE5CPU, VE5TP, VE5ZG, VE5RC, VE5RG. **VE2CMH:** VE2FAL, VA2TO, VA2MP, VE2TPE, VE2LOA, VA2TG. **VE2CQ:** VE2ETR, VE2KDC, VE2NZR, VE2GDA, VE2PS, VE2MIG, VE2ARO, VE2XZT, VE2MY. **VE2CSI:** K1MV, K1MY, KT1O. **VE3DC &** VE3AHQ, VE3BK, VE3OCY, VE3OZO, VE3VMO. **VE3KPP &** VE3SLI. **VE3MIS:** VA3UA, VE3XAP, VE3SQG, VE3IMG. **VE3RM &** VE3WIB, VA2SMF. **VE6AO:** VE6BIR, VE6TN, VE6KC, VE6TC. **VE6SV &** VO1CV, VE7GAS, VE6AKY, VE6MRT, VE6NAP, VE6VW. **VE7SCC:** Club. **VK4WIL &** VK4DZ, VK4CEJ, VK4FJ, VK4SN. **VO2CQ &** Others. **VP5DX:** AB4UF, K4UTE, N4EPD, N4KE, NF4L, NU4Y. **VP5L:** LA4DCA, LA5KO, LA9HW. **VY2SS &** VY2LI, W1VE/VE1RM, VE9GJ, VE9DX. **W1HR:** W1JCC, W1MD. **W1SRG:** AG1C, KA1VWX. **W2A:** W2XX, N2TX, KE2TR, NY6DX. **W2LC &** K1PY, KC2GFA. **W2UP &** WA3KPP. **W3GNQ &** N3MIT, WI2T, W3RFC, W3ZZ. **W3LJ &** K3NCO, K8DH. **W4CAT:** N4JN, K1KY, N4PQV, WO4O, KG4ENY, KQ6ID, K4OOO, K4BEV, W9WI.

W4MR: AA4NC, K4MA, KI7WX, N4CW, K4HA. **W4SVI:** W3AKI, KF4PXW, KF4QQT, NØOSG, N4LTT. **W4WS:** N4VHK, KU4BP, WB4MSG, KT4CD, NØKTY, KE4CPO, N4IOZ, WB4KQN, KC4WSK. **W4ZR:** W4FDA, KC4FWS, WA4ET. **W6EEN &** K6XZ, W6AQ, N6RT, KR6X. **W6XR/2 &** N2AU, N2VR, W2AD. **W6YRA:** KC6LDO, WA6AYI, KE6TZX, KU6T. **W7/KL7CQ &** N7PVV, KD7IOG. **W7FIO:** KA5IMS, W7ACC. **W7NG &** K7ROK. **W7VJ &** NN7L. **W9REG:** N9LF, W9FN, KB9SSS, N9KT, KA1LXG. **WB2KHO &** KB2NOW. **WM3T &** KF4OKG. **WN9O &** K8JP, K9IG, N9NS, W9IU. **WS4Y &** K4WA, W4OSE, W4TMM, KT4BQ, KD7CTR, ACØM. **WY3T &** W3BDR. **XU7AAP:** YBØUS, XW2A. **YL7C:** YL2MD, YL2EQT, YL2RQ. **YM3WW:** TA3BN, TA3ET. **YN2EJG:** W5GCX, K5LBU. **YP3A:** YO3ND, YO3FWC, YO3FLR, YO3GDA, YO3GRE, YO3GOD, YO9FJW. **YU1INO:** L. Radosavljevic, S. Radosavljevic, Mladenovic, YU1EK, Golubovic, Dzurdzic. **YU7AJM:** 4N7TA, YT7XT, Ivan, Stanislav, Andrej, Paulina. **ZB2X:** N7BG, W6NV, OH2KI. **ZL3DXC:** ZL3NZ, ZL3GA, ZL3GS, ZL3TS, ZL3VML, ZL3AK, ZL3JU, ZL3SZ, ZL3ACA. **ZW5B:** PY5EG, PY5CC, PY5GU, PY2KC, 4X6TT, LU6ETB.

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SSB RESULTS
SINGLE OPERATOR
NORTH AMERICA
UNITED STATES

KQ2M/1	**A**	**6,081,879**	**3449**	**150**	**519**
N1EU	**"**	**2,497,500**	**1459**	**134**	**491**
NT1N	**"**	**2,374,050**	**1661**	**137**	**388**
W1AO	*	2,055,168	1515	110	402
K5MA/1	*	1,786,670	1381	116	363
W1KT	*	1,412,896	989	126	410
K1VDF	*	1,346,796	1272	88	308
W1KRS	*	1,158,840	944	107	337
W1TE	*	1,099,584	962	92	322
W1OP	*	1,084,464	994	90	318
			(Op: K1PLX)		
N1API	*	1,049,191	1058	81	296
KK1DX	*	1,024,920	813	113	355
K1UQ	*	939,153	954	81	286
K1CN	*	857,982	829	103	307
W1RH	*	654,075	765	79	244
W1US	*	543,850	621	89	276
			(Op: K1LOM)		
K1BV	*	526,108	734	62	213
AK1N	*	490,032	565	93	239
K1RX	*	470,393	618	64	223
KK1H	*	452,023	581	80	239
N4XR/1	*	444,864	556	82	249
W1OHM	*	300,846	428	75	191
W1MK	*	294,148	466	82	220
N1JW	*	269,132	423	62	182
N1RY	*	259,965	358	64	201
K1RM	*	222,564	420	46	158
W1WFZ	*	162,981	257	71	202
W1ZZ	*	82,362	196	45	114
AA1KM	*	10,816	136	17	47
KB1CJ	*	8,908	56	25	43
W1NXB	*	4,977	79	22	41
K1RO	**28**	**793,854**	**1567**	**36**	**147**
W1CC	*	33,252	133	18	84
K2SS/1	**21**	**1,257,792**	**2344**	**38**	**154**
N1HRA	*	105,732	333	29	103
N1CPC	*	26,062	155	20	63
K1QS	**14**	**261,284**	**614**	**36**	**130**
W1ZK	*	163,449	411	31	112
WA1MKS	*	62,330	240	27	88
K1LZ	**3.7**	**118,260**	**551**	**23**	**85**
K5ZD/1	1.8	736	24	6	10
***K1ZM**	**A**	**3,368,010**	**1907**	**151**	**504**
***K1VUT**	**"**	**1,617,270**	**1291**	**110**	**360**
***W1CTN**	**"**	**1,452,752**	**1222**	**112**	**364**
*KS1J	*	1,391,104	1228	96	322
*WS1A	*	1,148,545	959	105	340
*AE1B	*	1,147,058	1105	92	282
*AA1EY	*	1,069,552	963	100	312
*N1SV	*	940,912	897	101	333
*KA1PRD	*	869,272	859	94	292
*W1DAD	*	849,744	833	93	285
*N1PGA	*	749,990	767	86	284
*N1AO	*	685,470	719	84	281
*N1WK	*	618,510	699	70	248
*K1HT	*	609,528	651	90	237
*W1ZS	*	597,830	709	72	241
*N1RJF	*	594,664	685	78	250
*N1FUS	*	415,916	584	68	214
*N3KCJ/1	*	410,496	555	70	221
*K1SD	*	353,028	459	74	218
*WT1O	*	281,400	495	51	159
*AA1SU	*	270,364	421	68	189
*W1GOU	*	189,003	345	56	172
*N1DS	*	169,433	378	53	158
*W3TB/1	*	152,164	289	59	159
*K1YZ	*	151,353	329	51	150
*N1ZZN	*	146,520	275	58	140
*AB1R	*	132,861	258	60	141
*WA1OFR	*	111,156	276	45	132
*KD1R	*	84,564	215	54	120
*W1PJ	*	84,214	201	41	117
*N1WEZ	*	72,698	249	52	111
*N1HTS	*	27,810	106	29	74
*W1DAR	*	24,947	128	27	74
*KQ1F	*	22,194	107	20	61
*N1VI	*	12,710	71	27	55
*W1TW	*	10,296	82	26	46
*W1TO	*	9,790	66	15	40
*KD1OG	*	9,685	55	22	43
*K1MOM	*	8,757	59	26	37
*KB1EAA	*	6,156	89	28	48
***WE1USA**	**28**	**454,817**	**983**	**36**	**137**
*K1VSJ	*	75,596	257	27	88
*KY1B	*	26,058	145	22	64
*N1SR	*	25,912	126	20	59
***W1EL**	**21**	**204,400**	**513**	**29**	**111**
*WG1Z	*	16,464	104	11	45
*K1YA	14	10,128	78	11	37
N2NT	**A**	**4,801,572**	**2928**	**142**	**479**
N2LT	**"**	**4,166,856**	**2473**	**147**	**459**
K2DM	**"**	**3,131,201**	**2190**	**124**	**399**
N2MR	*	1,402,704	1113	103	356
N2WK	*	1,400,985	1116	115	374
W2LU	*	1,309,575	1152	112	363
N7UN/2	*	1,221,264	1060	99	333
K2SX	*	844,182	830	88	298
KB2NMV	*	584,753	572	102	301
W2YE	*	372,900	478	77	223
K2FR	*	356,396	485	68	210
WR2V	*	354,556	523	65	209
W2ZU	*	304,325	491	59	200
K2TV	*	235,488	418	54	169
N2AUK	*	233,298	443	54	180
W2MKW	*	189,056	343	51	160
N2GC	*	115,920	208	61	146
WK2H	*	99,918	236	53	129
W2YG	*	66,755	193	45	124
W2RW	*	62,604	195	51	90
N2SCJ	*	33,768	120	41	85
N2LEB	*	27,474	106	41	73
N2XYZ	*	21,746	112	27	56
K2APF	*	14,842	74	28	54
N2VM	*	11,455	76	25	54
KV2M	*	9,372	55	26	45
N2IZM	*	2,652	29	15	24
W2RE	**28**	**911,904**	**1804**	**34**	**150**
W2FU	**21**	**700,785**	**1460**	**38**	**141**
KD2N	*	62,271	243	21	78
N2CU	*	2,250	36	12	18
KC2Q	**14**	**69,474**	**217**	**33**	**96**
W2VO	**1.8**	**5,500**	**61**	**14**	**30**
***NA2U**	**A**	**1,926,320**	**1445**	**108**	**376**
***W2TZ**	**"**	**1,817,712**	**1420**	**109**	**359**
*K2CS	*	917,000	989	93	257
*WE2F	*	896,815	845	97	318
*K2UF	*	673,440	693	90	276
*WB2ZTH	*	650,428	551	113	339
*N1IBM/2	*	387,093	468	91	243
*KM2L	*	367,488	538	60	201
*NA2A	*	360,701	482	69	202
*N2KJM	*	241,820	406	52	174
*W2CVW	*	167,334	302	57	171
*W2YK	*	146,222	277	60	166
*N2CK	*	130,849	275	54	125
*W2UV	*	114,492	283	54	134
*W2VU	*	104,130	225	52	126
*N2XG	*	103,113	307	52	119
*K2DBK	*	87,542	221	43	126
*WA2RF	*	82,521	202	41	118
*K2SZ	*	80,364	233	33	106
*W2PI	*	70,680	176	44	111
*N2LQQ	*	63,516	182	39	95
*W2FUI	*	59,280	165	51	79
*K2YSY	*	50,456	147	38	98
*KA2SLC	*	25,397	89	38	71
*WA2BMH	*	21,000	90	20	50
*K2CY	*	16,340	77	30	56
*N2NYR	*	15,652	85	29	57
*WB2AIV	*	14,960	69	32	53
*KD2P	*	10,557	62	22	47
*KC2FYJ	*	9,768	60	20	46
*N2OPW	*	8,340	74	23	37
*AB2JG	*	4,656	42	13	35
***K2MFY**	**28**	**240,552**	**621**	**33**	**123**
*KA2NDX	*	133,309	389	31	102
*K2CF	*	48,216	199	22	76
*W3EH/2	*	17,622	103	18	48
*W2YRW	*	54	19	4	14
***N2MF**	**21**	**164,250**	**440**	**34**	**112**
*K2BQW	*	117,533	395	24	96
*WA2ASQ	*	8,896	171	20	69
*KC2DVD	14	1,530	32	10	20
***W2MF**	**1.8**	**1,334**	**44**	**8**	**15**
K3ZO	**A**	**4,505,614**	**2762**	**140**	**453**
W3BGN	**"**	**3,867,552**	**2264**	**140**	**484**
K2PLF/3	**"**	**3,042,390**	**2068**	**124**	**414**
WT3W	*	2,273,850	1477	126	432
K3NW	*	1,642,599	1061	129	438
N3HXQ	*	1,042,028	1049	89	288
W3RJ	*	980,784	1179	85	251
W3AP	*	958,892	933	102	305
N3RJ	*	747,852	880	86	262
N3KR	*	606,472	666	79	265
W3BYX	*	569,742	623	82	271
W3LJ	*	537,654	582	88	278
K4JLD/3	*	523,800	609	93	267
KM3J	*	483,585	596	76	233
AJ3M	*	431,100	536	78	222
W3YD	*	425,729	546	71	222
N3UM	*	323,675	449	68	207
W3AZ	*	316,020	523	72	204
AA3TT	*	272,403	422	59	184
K3MGT	*	269,136	395	63	204
N3FX	*	247,719	428	54	159
W3KV	*	210,371	358	63	170
W3FVT	*	191,700	344	55	158
NQ3N	*	182,900	372	64	172
W3IQ	*	174,383	362	51	140
K3SX	*	133,540	260	77	143
W3EKT	*	131,495	303	58	163
AD3Z	*	121,191	298	60	143
W3JRY	*	89,881	205	46	128
K3PD	*	74,261	185	48	109
K3CKO	*	42,966	161	33	93
W3INK	*	23,760	118	20	68
K3JRR	28	8,176	53	19	37
K3IC	**21**	**269,662**	**669**	**31**	**115**
K3SV	**3.7**	**24,080**	**117**	**18**	**62**
***KQ3V**	**A**	**1,505,787**	**1177**	**110**	**361**
*N3WD	*	400,722	551	71	211
*K3DSP	*	369,234	516	71	210
*N3UN	*	316,680	417	88	224
*K1EFI/3	*	315,715	480	49	184
*W3DQ	*	295,692	452	65	181
*KE3VV	*	255,151	403	64	183
*WF3M	*	232,386	369	61	170
*W3BEN	*	150,598	310	54	163
*W3CP	*	140,390	289	56	146
*WN3VAW	*	114,318	219	70	149
*W2BZR/3	*	69,654	204	38	98
*K3IRV	*	66,360	191	53	105
*N3QVD	*	61,070	177	45	110
*W3EEE	*	56,426	154	54	124
*N3SEO	*	55,176	158	38	94
*N3EYB	*	43,763	162	28	79
*W3FQE	*	2,240	32	9	26
***WR3L**	**28**	**185,920**	**424**	**32**	**128**
*N3NT	21	24	2	2	2
K4ZW	**A**	**5,688,640**	**3322**	**140**	**473**
W4AN	**"**	**5,622,732**	**3229**	**150**	**476**
				(Op: N2IC)	
K4XS	**"**	**5,351,048**	**3309**	**152**	**474**
K4AB	*	3,801,438	2332	151	455
N6AR/4	*	2,130,708	1628	114	389
KZ2I/4	*	1,615,184	1243	108	364
WA4TII	*	1,522,071	1129	126	387
N4PQX	*	1,246,392	908	123	381
AG4W	*	1,215,138	1105	96	321
K4YT	*	1,112,335	972	103	324
K4BBN	*	1,045,856	1007	95	297
WC4E	*	1,002,168	1004	94	278
N4UH	*	980,016	933	100	308
K4LTA	*	976,210	957	110	300
W4KJ	*	957,076	931	102	310
AA4V	*	851,838	885	107	295
K4BP	*	848,202	848	89	284
N4MM	*	747,564	713	101	314
NW6S/4	*	691,642	733	94	295
WB4OMM	*	612,535	650	105	302
N4KW	*	513,968	542	95	258
N4GU	*	508,164	625	86	232
K4FYM	*	467,208	547	82	227
K2OY/4	*	433,956	545	94	254
W4SI	*	422,807	593	72	217
W7QF/4	*	368,760	496	70	210
W4YDY	*	328,152	474	62	202
NJ2F/4	*	308,028	443	72	194
KE4UTX	*	292,825	430	65	200
WT2J/4	*	280,368	445	77	220
W4NYY	*	258,475	417	63	182
W4WNT	*	250,902	371	63	200
AA3VA/4	*	204,798	394	61	153
W3TMZ/4	*	164,768	240	79	192
N4EL	*	143,838	295	45	138
W4NZC	*	143,376	271	55	151
W4UEA	*	138,744	267	60	148
W9IGJ/4	*	121,319	240	67	140
W4TDB	*	106,036	242	61	135
KE4OAR	*	77,792	206	43	100
W4ZYT	*	76,260	193	38	117
W4RX	*	69,632	233	30	106
AK4ST	*	68,320	216	52	108
K4TBN	*	66,529	368	73	169
K4VV	*	63,325	174	44	105
K8AC/4	*	21,888	97	38	58
N2BT/4	*	7,119	44	25	38
W4ZV	**28**	**1,304,873**	**2410**	**38**	**155**
K3RV/4	*	845,556	1636	36	150
KØEJ/4	*	695,184	1527	36	132
K4VUD	*	512,850	1307	34	116
WD4K	*	387,440	1035	33	112
K9ES/4	*	364,224	1063	33	135
K9HUY/4	*	188,105	525	29	112
W2EA/4	*	46,944	190	27	75
				(Op: N2FY)	
WB4NRI	*	19,477	212	34	67
NN4T	**21**	**888,740**	**1810**	**38**	**147**
N4CT	*	534,650	1183	37	133
NN4K	*	66,468	238	26	90
K4ISV	**14**	**734,558**	**1533**	**39**	**154**
KS7O/4	*	438,472	986	38	146
WD4CNZ	*	69,854	265	23	83
AA4ZZ	*	36,768	146	27	69
N4EK	*	34,968	169	21	72
KF4QQT	*	22,446	108	26	60
KE4SCY	**7**	**64,310**	**223**	**28**	**90**
NC4NC	*	25,800	142	23	63
K4TX	*	15,642	85	20	46
N4UK	**3.7**	**87,238**	**372**	**25**	**81**
AA4MM	**1.8**	**775**	**45**	**11**	**20**
***NF4A**	**A**	**1,973,760**	**1526**	**112**	**368**
***N4IG**	**"**	**1,115,625**	**1025**	**103**	**322**
*N4YDU	*	1,099,210	1134	96	314
*N4DL	*	1,070,160	1044	91	301
*N8WRL/4	*	884,811	958	83	278
*NA4K	*	833,408	801	97	286
*W4LC	*	783,208	783	88	288
*K7SV/4	*	681,464	734	88	256
*NQ4U	*	651,552	704	86	266
*N4DW	*	499,744	604	83	239
*NC4ME	*	483,046	660	77	230
*K4RFK	*	482,460	577	83	247
*K4PHE	*	479,880	582	81	229
*W4IDX	*	405,912	518	77	235
*W4DHE	*	319,872	479	71	201
*W4NTI	*	312,312	452	75	198
*WR4K	*	303,880	406	74	210
*KT4Q	*	225,264	379	68	160
*NJ8J/4	*	220,410	389	66	171
*KK4TA	*	211,990	388	51	164
*KU4FP	*	210,330	351	67	179
*WX4DX	*	166,483	382	66	163
*K4UVT	*	153,675	282	60	165
*AG4CZ	*	149,760	307	57	138
*K4GKD	*	105,032	244	54	112
*KE4MVK	*	94,830	236	46	128
*KG4GSY	*	51,745	185	38	89
*W4YE	*	47,988	161	35	94
*K4KJ	*	45,120	168	43	98
*KG4ICF	*	32,568	120	36	82
*KG6AR/4	*	24,638	141	47	80
*NI4S	*	23,587	102	33	70
*KS4JB	*	18,792	96	25	62
*N3TG/4	*	16,833	73	35	58
*WB4DNL	*	13,932	64	36	50
*WE4V	*	13,800	74	26	49
*N2UX/4	*	12,750	83	29	56
*N4CW	*	7,812	49	23	40
*AF4RK	*	7,076	59	16	42
*N4JN	*	6,840	50	26	34
*KØCOP/4	*	6,812	62	16	36
*K4PZC	*	5,325	64	30	41
*W3AKI/4	*	100	7	6	7
***N2EE/4**	**28**	**722,232**	**1567**	**32**	**136**
				(Op: K3BU)	
***K4WI**	**"**	**644,499**	**1345**	**37**	**134**
*K4UCF	*	376,464	968	29	109
			(Op: KD4RWN)		
*K4TMC	*	260,015	692	27	106
*NY4T	*	214,314	600	27	111
*W3NC/4	*	204,684	512	33	115
*KG4BIG	*	193,880	563	28	103
*W4/NH6T	*	123,586	410	26	96
*KD4RKJ	*	47,336	240	24	73
*K4PI	*	33,396	155	22	70
*WD4PTJ	*	18,585	107	19	44
***N4MO**	**21**	**230,005**	**537**	**35**	**122**
*W3KHQ/4	*	16,259	90	21	50
*KU4OS	*	9,782	93	20	53
*KF4PXW	14	210	11	4	10
W5KFT	**A**	**3,838,632**	**2688**	**148**	**436**
K5RA	**"**	**1,289,210**	**1062**	**121**	**349**
K5XR	**"**	**1,102,608**	**1055**	**95**	**308**
				(Op: W5ASP)	
N5JR	*	1,009,867	1026	91	268
W9DX/5	*	742,196	753	91	273
KE5K	*	543,840	657	81	228
W5RZ	*	346,086	495	70	191
N5RXF	*	294,069	629	67	182
WA5SOG	*	289,449	448	72	189
AB5C	*	268,580	379	79	181
N5DD	*	246,673	358	73	196
N2LA/5	*	224,064	343	84	204
N5JB	*	177,192	335	59	155
K5VG	*	19,500	84	37	63
K6AZA/5	*	4,743	46	23	28
K5RX	**28**	**912,890**	**1771**	**39**	**154**
KZ5MM	**"**	**689,067**	**1524**	**38**	**143**
N7DF/5	*	673,040	1576	37	142
K5AM	*	625,988	1413	36	128
W5ZO	*	229,437	598	33	126
W5AN	*	264	8	3	8
W5TM	**21**	**405,840**	**1107**	**36**	**142**
N5MV	*	215,064	745	38	136
W5FO	**14**	**247,623**	**550**	**37**	**140**
W5WMU	*	138,507	486	34	103
KM5WR	*	16,352	101	22	51
W5OB	**3.7**	**20,960**	**121**	**21**	**59**
***N5AW**	**A**	**1,079,766**	**917**	**120**	**326**
***WD5K**	**"**	**886,298**	**830**	**108**	**298**
*NN5T	*	665,030	689	98	267
*KØCIE/5	*	496,107	687	72	205
*KM5VI	*	201,600	356	68	172
*KF5YZ	*	120,393	272	60	129
*WK5K	*	114,204	246	63	123
*N5ASA	*	103,305	245	70	143
*N5AF	*	67,725	179	49	99
*N1QXV/5	*	63,504	228	55	113
*KI5DR	*	45,120	137	48	93
*K5OR	*	44,888	156	51	73
*AJ4F/5	*	29,875	106	49	76
*KY5S	*	28,421	119	29	68
*KT5Q	*	22,692	154	50	74
*KD5CKP	*	11,800	84	39	61
*WA9AFM/5	*	100	13	10	9
***AC5SU**	**28**	**144,573**	**407**	**29**	**107**
*W5CWQ	*	123,952	353	29	98
*KD5FUM	*	130	9	7	6
W6AX	**A**	**4,431,712**	**2837**	**161**	**447**
				(Op: N6IG)	
N6ED	**"**	**2,601,228**	**1928**	**147**	**372**
K6NA	**"**	**2,457,046**	**1706**	**150**	**388**
KA6SAR	*	1,896,792	1880	115	293
KI6CG	*	1,319,695	1291	114	281
NN6XX	*	1,116,144	1017	108	306
WW6O	*	682,318	770	84	242
W6KNB	*	581,000	643	99	233
N6IC	*	502,830	596	88	245
W6IXP	*	456,955	654	97	198
K7JJ/6	*	415,800	517	100	208
AJ6V	*	401,202	565	87	192
N6OU	*	385,560	493	92	214
K6GT	*	383,091	512	86	191
W6FRH	*	366,928	451	89	215
N6TW	*	356,459	521	82	175
N6NG	*	356,396	479	82	196
W6QEU	*	334,110	637	82	219
KD6QK	*	296,769	505	78	175
AD6KA	*	274,652	473	67	171
KG6AO	*	245,273	378	92	167
W6MVW	*	110,200	269	64	136
K6JAT	*	105,448	300	74	122
NF6R	*	48,954	149	42	81
N6IBP	*	47,040	106	75	93
NY6Y	*	40,584	135	39	75
W6ISQ	*	10,336	53	32	44
K6VNX	*	7,952	54	19	37
W6NL	**28**	**834,720**	**1711**	**38**	**147**
W6SR	*	447,564	1191	36	115
W6AFA	*	364,645	966	35	114
K6KO	*	301,920	701	38	122
AK6R	*	254,592	1103	34	102
KC6AWX	*	191,430	704	34	101
K6UO	*	52,272	174	30	78
K3EST/6	**21**	**931,516**	**2104**	**38**	**141**
W6DCC	**14**	**64,614**	**242**	**31**	**90**
N6WR	*	16,770	104	23	42
N6HY	**7**	**11,484**	**130**	**22**	**44**
W6RJ	**3.7**	**116,280**	**647**	**34**	**80**
N6BU	*	15,925	111	24	41
***K8PO/6**	**A**	**1,973,075**	**1631**	**135**	**332**
***N6NF**	**"**	**704,855**	**844**	**86**	**219**
*K6UM	*	571,560	630	97	233
*W3SE/6	*	431,886	527	104	235
*AA6PW	*	402,000	658	72	168
*N6JM	*	335,102	454	83	191
*W6SA	*	232,656	423	79	143
*W6RCL	*	215,985	368	86	145
*K6SG	*	152,295	308	60	135
*N6OPR	*	140,940	324	76	167
*WB6NFO	*	105,324	246	68	98
*W1SRD/6	*	103,500	230	62	118
*W6FFH	*	72,372	255	37	74
*AA6EE	*	71,090	201	55	98
*WO6M	*	64,930	189	54	97
*NI6FW	*	63,311	197	54	82
*AD6G	*	58,850	221	43	67
*W6SI	*	58,653	232	58	89
*K6CSL	*	48,729	172	52	59
*W6HYK	*	42,120	149	43	61
*K6XX	*	14,328	76	30	42
*K6LDX	*	4,576	47	18	26
*N6EM	*	2,295	23	22	23
***K7JA/6**	**28**	**405,748**	**854**	**37**	**135**
***WA7BNM/6**	**"**	**383,295**	**848**	**35**	**130**
*W6EUF	*	199,572	455	37	130
*KG6CEH	*	80,775	396	23	52
*W6JEN	*	53,675	212	26	69
*KC6OKU	*	2,436	45	13	15
*K6ZCL	*	572	15	6	7
*KF6IIU	*	156	9	6	6
***WC6H**	**21**	**286,800**	**721**	**35**	**115**
				(Op: NU6S)	
*N6WS	*	228,138	593	35	106
*N6IFR	*	65,208	258	29	75
***KU6T**	**14**	**36,491**	**166**	**26**	**65**
*W6YJ	7	16,244	101	22	40
W7GG	**A**	**3,469,635**	**2359**	**160**	**425**
W7AT	**"**	**2,944,090**	**2133**	**153**	**392**
				(Op: W7EW)	
K7RI	**"**	**2,423,456**	**2094**	**138**	**358**
K5RR/7	*	2,113,716	1627	130	348
W7UT	*	1,266,037	975	120	347
K7BTW	*	1,137,504	1286	97	231
K7NV	*	1,107,264	898	126	348
K7XN	*	994,400	1205	97	255
KI7M	*	762,405	855	119	252
N7RO	*	701,190	828	82	233
W7IJ	*	634,161	658	106	257
N7ZT	*	475,636	574	111	221
WA7LNW	*	462,573	650	96	213
KS7T	*	389,018	561	73	186
K7GEX	*	330,120	448	93	222
KK7VC	*	278,300	442	68	174
N7WI	*	273,910	499	77	168
KC7UP	*	206,856	362	63	158
K6TIM/7	*	104,139	279	72	189
K7UQT	*	79,278	218	51	95
N7JT	*	70,824	169	47	109
W7QN	*	70,560	208	53	87
W6JA/7	*	64,800	212	50	94
NF7E	*	50,005	170	54	83
WA2OCG/7	*	45,990	182	43	83
N7LYV	*	13,356	104	32	52
W7OT	*	6,174	47	24	25
KK7CG	*	4,050	40	23	27
N7KU	**28**	**462,700**	**1190**	**37**	**138**
				(Op: NJ6D)	
W7ZR	**"**	**462,000**	**1222**	**35**	**119**
W8AEF/7	*	279,590	759	31	115
W7TSQ	*	95,700	324	30	80
W7LGG	*	95,121	309	31	91
K7ON	*	84,672	283	29	83
W7IIT	*	36,936	162	27	54
W7AYY	*	20,727	113	21	42
W7WA	**21**	**951,018**	**1830**	**38**	**148**
W7FP	*	226,899	547	35	118
W7ACD	**1.8**	**1,040**	**28**	**7**	**10**
***K7HBN**	**A**	**751,983**	**727**	**105**	**262**
***WN7J**	**"**	**619,632**	**687**	**94**	**237**
***K7ZZ**	**"**	**591,175**	**707**	**93**	**232**
*N7UJJ	*	440,307	718	78	163
*KE7NS	*	418,362	548	91	203
*N7EMC	*	187,771	373	58	121
*WQ7R	*	179,375	337	71	134
*AB7RW	*	179,340	338	72	138

*KW7N	"	160,576	330	64	129
*KE7RT	"	140,400	316	66	114
*K7TR	"	135,546	335	56	118
*N3AIU/7	"	94,122	324	58	104
*W7QDM	"	74,620	181	64	118
*KC7WUE	"	53,449	180	44	69
*N7TL	"	48,620	160	52	78
*W7YVK	"	47,524	150	43	66
*W8EQA/7	"	30,590	129	40	75
*K7OVW	"	27,435	112	31	62
*W3IBW/7	"	23,406	122	38	56
*NA7R	"	21,828	117	31	37
*WB7SWW	"	160	14	8	8
***K7YAK**	**28**	**83,685**	**300**	**28**	**77**
*W7YS	"	44,283	199	24	63
*KI7XA	"	27,948	146	24	44
*N7XY	"	9,920	74	22	40
***KK7JS**	**21**	**225,592**	**529**	**36**	**127**
*W7UPF	"	107,715	328	32	97
*KC7KQI	"	132	11	2	2
*N7FYT	14	30,268	150	26	66
*KC5AC/7	"	5,616	49	19	29
*KØZT/7	"	2,304	23	16	20
K8DX	**A**	**3,732,344**	**2482**	**142**	**439**
K2UOP/8	**"**	**1,274,544**	**997**	**118**	**359**
WB8TLJ	"	1,131,038	1016	106	324
K8AO	"	1,076,154	996	100	302
W8KEN	"	891,274	872	99	287
K6VWE/8	"	565,008	662	78	238
N4SEA/8	"	513,925	600	82	255
K8RS	"	487,550	607	91	259
NC8V	"	341,910	559	70	191
W8PG	"	320,790	485	74	215
N8VX	"	217,972	394	58	168
K8VW	"	165,120	366	55	160
W8CS	"	95,046	205	49	137
W8MHV	"	84,000	226	35	115
W8KZM	"	52,173	202	41	112
KC8CON	"	43,112	147	40	96
WA8RSA	"	36,062	152	51	95
K3ZJ/8	**28**	**687,420**	**1451**	**36**	**135**
K8IR	"	49,140	192	24	66
W8UD	**21**	**266,455**	**608**	**37**	**124**
K8TLC	14	9,344	111	17	47
K8MD	3.7	6,664	62	12	37
***K5IID/8**	**A**	**899,730**	**885**	**96**	**294**
***N8KM**	**"**	**827,328**	**823**	**93**	**279**
***KF8K**	**"**	**773,190**	**774**	**92**	**271**
*N8CN	"	709,664	799	88	243
*K3XO/8	"	691,782	744	86	276
*K8GT	"	458,880	543	84	236
*KI8IZ	"	277,718	445	60	179
*K8LY	"	256,151	463	71	188
*N8KIE	"	253,693	377	67	185
*W8VE	"	179,244	336	66	168
*N8BV	"	178,256	350	53	155
*KI8IK	"	166,208	310	73	151
*N8NX	"	165,060	305	62	148
*W8IDM	"	145,728	293	47	145
*KC8HWV	"	145,700	299	48	140
*AK8B	"	91,692	219	45	117
*K8VUS	"	83,721	217	49	128
*N8EN	"	48,375	174	35	94
*NØNGT/8	"	34,440	143	30	93
*W8MKO	"	33,695	131	30	85
*N8XWO	"	28,112	111	41	71
*N8NYI	"	26,811	123	23	58
*K8CV	"	23,958	92	32	67
*K8FK	"	15,575	74	33	56
*KA8JXG	"	7,544	62	31	51
*KC8JYU	"	7,378	59	18	44
*KG8CX	"	660	11	11	11
*N8WEL	"	294	10	6	8
***W8UMR**	**28**	**106,941**	**338**	**26**	**97**
*K8AJS	"	60,027	211	22	85
*W8KNO	"	47,830	242	25	54
*KF8BT	"	45,687	191	23	74
***NG3Q/8**	**21**	**185,000**	**479**	**32**	**116**
*KA8WQL	"	101,402	331	23	92
*AD8J	"	45,570	185	23	70
***KC8LMG**	**14**	**28,106**	**201**	**24**	**70**
*AB8JR	"	24,360	123	24	63
*N8WDH	"	10,296	106	19	53
*KE4VYZ/8	"	2,080	27	10	22
***K8DO**	**3.7**	**2,288**	**90**	**7**	**9**
W9RE	**A**	**5,287,976**	**2900**	**157**	**510**
WB9Z	**"**	**3,624,410**	**2288**	**143**	**443**
K9NW	**"**	**3,524,125**	**2194**	**149**	**456**
K9BGL	"	2,039,151	1470	131	388
NA8V/9	"	1,385,550	1142	114	336
K9SD	"	1,139,054	1052	113	300
K9MWM	"	674,532	875	107	262
KB9CRY	"	604,835	603	101	284
N2BJ/9	"	549,189	513	105	312
N9QQK	"	447,760	603	69	221
W9GXR	"	376,915	500	72	224
K9ZO	"	362,304	458	92	214
NF9V	"	361,746	508	73	188
K9UQN	"	331,059	493	68	199
W9VA	"	314,820	439	69	196
N9PQU	"	252,255	293	77	258
AA9TB	"	236,880	417	54	181
K9MI	"	235,855	396	53	162
W9BCV	"	208,772	359	77	191
K9XV	"	139,302	299	58	155
KG9N	"	121,800	380	36	80
W9GIG	"	121,500	195	74	176
KF9YR	"	106,428	238	53	128
KC9FC	"	101,736	302	39	123
N9GS	"	93,795	203	57	128
WA2USA/9	"	61,440	175	39	89
K9RSW	"	43,197	127	44	75
W9BZP	"	37,380	134	17	72
KG9PQ	"	17,255	129	31	54
KJ9C	"	6,916	53	21	31
K9LU	**28**	**305,064**	**812**	**34**	**118**
W9OP	"	197,428	491	34	120
W9OF	"	177,285	389	34	125
W9YYG	"	167,524	451	31	113
K9YNF	**14**	**107,152**	**305**	**30**	**109**
N9HCA	"	97,776	357	29	97
WD9FEN	"	11,200	96	22	42
K9CJ	7	4,608	50	8	28
***N9UA**	**A**	**809,571**	**760**	**98**	**301**
***K9QVB**	**"**	**620,224**	**773**	**90**	**262**
***K9JE**	**"**	**599,005**	**724**	**82**	**244**
*K9YA	"	437,980	571	79	226
*N9REP	"	220,805	393	59	156
*WA9Z	"	204,972	392	59	169
*NG9L	"	187,480	328	56	162
*NV8V/9	"	179,025	368	63	154
*KB9KEG	"	120,384	293	62	136
*W9EV	"	79,453	216	41	111
*KB9JIF	"	76,877	404	60	150
*WT9U	"	67,925	180	45	98
*N9FWM	"	52,787	451	39	89
*W9LYN	"	52,096	160	58	90
*AA9NF	"	42,478	144	46	88
*N9KT	"	41,375	149	43	82
*WB9BSH	"	38,499	124	37	86
			(Op: IV3FSG)		
*W9WUU	"	26,322	115	35	72
*W9HL	"	24,684	99	34	68
*N9BOR	"	15,397	83	30	59
*W9LNQ	"	7,805	62	19	52
*KE9EX	"	5,126	61	24	54
*N9WW	"	2,135	26	15	20
***KE9R**	**28**	**261,807**	**725**	**32**	**115**
*WM9G	"	151,257	423	27	100
*W9GG	"	117,900	365	28	103
*N9HDE	"	21,063	123	15	44
*N9ALC	"	100	7	2	6
*KA9CBJ	"	100	4	3	4
*W9ILY	21	44,838	199	23	71
*K9AB	"	38,311	152	25	66
*KF9VJ	"	16,929	119	22	59
*KG9X	14	18,150	106	18	57
KØDU	**A**	**1,538,432**	**1481**	**122**	**326**
WØGG	**"**	**1,435,070**	**1195**	**119**	**336**
KØFJ	**"**	**1,026,172**	**929**	**119**	**350**
WØMW	"	750,546	764	102	267
KØGAS	"	602,875	709	95	230
KØDG	"	435,550	608	72	209
KØJJ	"	419,254	500	105	218
KBØENE	"	381,351	463	90	227
WØZP	"	295,289	519	74	165
AAØAI	"	282,816	399	79	209
KØCAT	"	256,932	419	60	184
WØPPF	"	161,836	300	64	160
KØJGH	"	149,695	292	78	157
WØOSK	"	128,112	263	73	131
WØHED	"	109,630	213	61	129
WBØIEL	"	106,414	237	48	127
KØFG	"	51,867	143	49	104
AAØZZ	"	7,490	61	29	41
KØCL	**28**	**677,022**	**1543**	**34**	**125**
N7DR/Ø	"	423,228	972	34	122
WØDET	"	19,126	110	20	53
KGØZI	**21**	**269,192**	**823**	**32**	**101**
KKØSS	**14**	**174,113**	**509**	**35**	**122**
NØRA	**7**	**40,800**	**165**	**25**	**75**
KØKX	"	36,955	154	24	71
***KVØQ**	**A**	**1,726,041**	**1308**	**138**	**361**
***KØUK**	**"**	**1,330,560**	**1100**	**135**	**345**
***ACØW**	**"**	**1,289,925**	**1136**	**111**	**330**
*KZØC	"	406,900	519	94	231
*WØETT	"	374,312	550	86	198
*AKØM	"	293,372	414	86	198
*KØCF	"	231,336	371	65	173
*KØVM	"	221,117	426	60	173
*NØNF	"	190,526	336	60	157
*KØSQ	"	173,400	336	56	148
*NØWY	"	146,034	321	50	133
*KØRL	"	136,884	287	49	134
*WAØDCB	"	129,204	290	54	140
*KØDAT	"	119,101	242	59	147
*K2HT/Ø	"	110,224	234	66	139
*KBØWPY	"	48,440	139	54	86
*KIØET	"	35,520	147	39	81
*NEØP	"	31,824	118	37	67
*NØLZ	"	19,992	84	37	61
*NZ4DX/Ø	"	13,202	84	35	47
*KAØEIC	"	9,150	65	30	45
*KAØZPP	"	725	18	12	13
***KØRS**	**28**	**262,860**	**645**	**35**	**121**
*KAØDX	"	84,439	275	28	93
*WDØGQA	"	5,508	58	23	45

ALASKA

KLØPG	28	8	8	5	3
***KL7FAP**	**28**	**59,092**	**347**	**26**	**42**

BARBADOS

8P1A	**A**	**12,136,203**	**8030**	**141**	**480**
			(Op: W2SC)		
8P6EX	"	522,100	1126	67	160
***8P6SH**	**A**	**1,337,588**	**2023**	**85**	**237**

BRITISH VIRGIN ISL.

***VP2VF**	**28**	**598,680**	**2271**	**31**	**89**

CANADA

VO1WET	**A**	**1,843,626**	**2153**	**71**	**256**
VE1OP	"	1,173,620	1280	97	307
VO1SA	"	939,792	986	70	266
VY1JA	"	85,587	287	61	80
VE1JX	**14**	**269,169**	**856**	**30**	**111**
			(Op: K6HNZ)		
VE9ST	**3.7**	**43,727**	**302**	**14**	**59**
XM1JF	**1.8**	**9,361**	**227**	**9**	**14**
			(Op: VE1JF)		
***VE1JS**	**A**	**713,280**	**819**	**76**	**244**
*VE9WH	"	547,560	640	88	263
VE2CQW	A	42,818	362	28	51
VE2PJ	**21**	**250,272**	**610**	**34**	**124**
***VE2AYU**	**A**	**1,177,050**	**1155**	**94**	**319**
***VE2GSO**	**"**	**885,750**	**1537**	**65**	**185**
*VE2AWR	"	677,976	860	71	247
*VE2XID	"	175,474	397	54	167
*VA2IC	"	71,995	369	34	85
*VE2OCP	"	21,049	120	34	63
*VE2QY	"	15,732	100	30	39
VE3OI	**A**	**4,916,913**	**3331**	**136**	**437**
VE3AT	"	2,577,498	2079	101	361
VE3ANX	"	293,904	804	40	117
VE3KZ	**28**	**610,986**	**1430**	**32**	**126**
VE3CFK	"	59,985	184	29	100
***VE3STT**	**A**	**1,363,648**	**1249**	**98**	**318**
***VE3OTL**	**"**	**1,225,456**	**1283**	**100**	**301**
*VA3SWG	"	654,082	996	73	213
*VA3VR	"	156,618	340	60	138
*VA3IX	"	23,285	297	18	45
*VA3SPN	"	1,665	32	10	27
*VE3BR	"	315	17	10	11
*VE3HG	28	43,560	202	24	66
***VE3MQW**	**14**	**143,480**	**411**	**29**	**107**
*VE3OIL	3.7	737	47	6	5
*VY2MGY/3	"	27	462	10	28
VE4IM	**A**	**414,318**	**491**	**96**	**251**
VE4RP	"	43,120	150	44	66
***VE4YU**	**A**	**349,790**	**515**	**78**	**185**
VE5FX	**28**	**443,265**	**1257**	**33**	**112**
VE5ZX	**21**	**293,012**	**1169**	**34**	**105**
VE5AAD	"	77,246	449	24	60
*VE5SF	21	3,472	56	13	15
VE6WQ	**21**	**1,211,660**	**2754**	**39**	**149**
VE6JY	**14**	**392,103**	**1000**	**36**	**135**
VA6RA	**3.7**	**21,584**	**309**	**15**	**23**
***VE5UA/6**	**A**	**785,897**	**936**	**111**	**250**
***VE6ZT**	**"**	**753,350**	**1016**	**84**	**221**
*VE6TN	"	195,546	372	76	142
***VA6MA**	**28**	**247,282**	**917**	**31**	**88**
*VE6BMX	"	214,365	1092	26	67
***VE6EX**	**14**	**167,940**	**785**	**26**	**82**
***VE6BF**	**7**	**22,707**	**115**	**25**	**62**
VE7IN	**A**	**451,796**	**1178**	**66**	**113**
VE7XO	"	266,633	221	80	152
VE7IO	"	100,848	237	63	128
VA7DP	"	44,640	387	27	35
VE7YJ	"	684	22	10	8
VE7XR	**14**	**516,591**	**1300**	**39**	**132**
VE7AV	"	20,025	100	20	55
***VA7DX**	**A**	**904,672**	**1505**	**103**	**169**
*VE7XF	"	758,190	760	114	267
*VE7UQ	"	388,355	607	86	167
*VE7CV	"	322,612	506	71	165
*VE7FCO	"	35,385	145	42	63
***VE7SV**	**28**	**698,026**	**1977**	**32**	**114**
*VE7NNN	"	45,820	348	20	38
***VY1MB**	**28**	**37,008**	**359**	**20**	**28**

CAYMAN ISL.

ZF2RV	**28**	**1,719,792**	**4335**	**36**	**126**
			(Op: WJ7R)		
ZF2AH	**21**	**512,400**	**1938**	**34**	**106**
			(Op: W6VNR)		
ZF2MC	**3.7**	**123,525**	**822**	**18**	**63**
			(Op: N7MQ)		

COSTA RICA

TI1C	**21**	**1,583,400**	**3900**	**39**	**143**
			(Op: TI2CF)		
TI4G	"	414,720	1841	27	101
			(Op: TI2WGO)		
***TI5WFM**	**28**	**1,077,846**	**2978**	**32**	**122**
			(Op: JA6WFM)		
*TI2DLL	"	260,736	1050	25	87
***TI5EBU**	**21**	**202,492**	**975**	**27**	**65**
			(Op: JM6EBU)		
***TI1Z**	**14**	**395,395**	**1256**	**30**	**113**
			(Op: TI4ZM)		

CUBA

***CO2II**	**A**	**426,288**	**1144**	**69**	**145**
*CO2OJ	"	269,874	975	46	95
*CO2PH	"	136,488	702	54	78
*CO2TK	"	120,834	550	49	88
***CO8TW**	**28**	**117,406**	**623**	**21**	**73**
***CO8ZZ**	**14**	**276,202**	**1011**	**30**	**96**
*CO8DM	"	85,260	405	23	75

DOMINICAN REPUBLIC

***HI3LFE**	**14**	**72,640**	**477**	**23**	**57**

EL SALVADOR

YS1RR	**28**	**303,506**	**810**	**34**	**129**
***YS1CF**	**A**	**7,728**	**92**	**17**	**29**

GUANTANAMO BAY

KG4VL	**A**	**1,650,480**	**2340**	**95**	**250**
			(Op: N5VL)		

GUATEMALA

TG9AMD	**21**	**82,880**	**702**	**19**	**45**

HONDURAS

***HR1AAB**	**A**	**24,898**	**658**	**22**	**37**

MARTINIQUE

FM5GU	**A**	**1,720,768**	**2351**	**89**	**233**

MEXICO

6D2X	**A**	**7,150,990**	**6177**	**144**	**374**
			(Op: K5TSQ)		
4A1UN	"	411,022	1310	54	97
XE1ZQC	"	135,594	519	56	106
XE1V	"	103,704	264	60	114
XE1L	**14**	**397,670**	**1557**	**34**	**96**
***XE3**					
/WØAH	**A**	**1,706,825**	**2569**	**95**	**240**
***4C2M**	**"**	**1,031,254**	**2287**	**85**	**153**
*XE2DN	"	871,044	1283	108	240
*XE2AUB	"	564,080	1482	55	121
*XE2MX	"	493,770	760	107	220
*XE1					
/AA6RX	"	324,576	404	102	234
*XE1MEX	"	238,560	427	77	147
*XE2HWH	"	187,485	647	53	92
***XE1CRO**	**21**	**812,592**	**2480**	**37**	**115**
*XE2TG	1.8	1,078	103	4	3

PANAMA

*HP1HEW	A	9,724	100	29	39
***HP1COO**	**28**	**75,480**	**415**	**21**	**64**
***HP1BYS**	**14**	**312,910**	**1125**	**28**	**102**

PUERTO RICO

NP4Z	**A**	**5,422,205**	**4558**	**122**	**423**
WP3W	"	543,439	728	89	235
KP4WW	**21**	**774,225**	**2539**	**34**	**121**
***WP4LNY**	**A**	**122,636**	**696**	**30**	**56**
***NP3E**	**28**	**184,092**	**1021**	**24**	**68**

ST. KITTS & NEVIS

V47KP	**A**	**5,107,368**	**4237**	**129**	**387**
			(Op: W2OX)		
V47NS	**28**	**1,230,732**	**3054**	**34**	**119**
			(Op: W9NY)		
V44NK	**14**	**309,669**	**1391**	**25**	**84**

SAINT MARTIN

FS/AH8DX	**A**	**7,860,300**	**6381**	**126**	**406**
FS/K4ZA	**"**	**6,334,030**	**5639**	**131**	**399**

ST. MAARTEN

PJ7/N4ZC	**A**	**6,063,535**	**4790**	**118**	**387**

U.S. VIRGIN ISL.

WP2Z	**A**	**8,937,000**	**7141**	**127**	**413**
			(Op: K6RO)		
KP2A	**28**	**2,623,330**	**5590**	**39**	**151**
			(Op: KW8N)		
KP2/K1VW	**7**	**277,290**	**1140**	**25**	**92**
***KP2E**	**28**	**406,644**	**1780**	**25**	**78**
*NP2JV	"	238,532	1083	26	72
***KP2BH**	**21**	**217,945**	**1171**	**25**	**66**

AFRICA

ALGERIA

***7X2RO**	**A**	**6,270**	**61**	**26**	**29**

CANARY ISL.

EA8AH	**A**	**13,965,672**	**7814**	**156**	**523**
			(Op: OH1RY)		
EA8AOT	"	141,694	267	58	145
EA8AD	"	82,125	362	34	50
EA8YG	1.8	1,575	30	7	14
***EC8AUZ**	**A**	**1,003,200**	**1872**	**50**	**150**
*EA8IK	"	39,627	136	37	82
***EA8FT**	**28**	**227,752**	**805**	**24**	**74**

CAPE VERDE

D4A	**A**	**10,911,021**	**6202**	**139**	**494**
			(Op: IV3TAN)		

CEUTA & MELILLA

EA9LZ	**28**	**2,510,943**	**5026**	**40**	**143**
***EA9CD**	**A**	**426,756**	**728**	**55**	**189**
*EA9AR	"	145,061	336	40	121

DJIBOUTI

***J28NH**	**A**	**804,418**	**1151**	**69**	**185**

EGYPT

***SU9ZZ**	**A**	**8,209,349**	**5182**	**118**	**433**
			(Op: OM3TZZ)		

ETHIOPIA

***9E1C**	**21**	**1,408,064**	**2750**	**40**	**156**

GHANA

***9G5MD**	**28**	**230,208**	**736**	**22**	**87**
			(Op: F5VCR)		

LIBYA

***5A1A**	**28**	**705,540**	**1872**	**29**	**103**

MADAGASCAR

5R8FU	**A**	**372,465**	**508**	**83**	**184**

MADEIRA ISL.

CT3BX	**A**	**10,830,688**	**6050**	**138**	**500**
			(Op: EA3NY)		
CT3/DJ6QT	"	4,200,585	3034	106	379
CT3GV	28	39,294	459	19	55
***CT9KY**	**A**	**322,531**	**445**	**74**	**195**

REUNION

FR5DX	**A**	**4,714,632**	**3531**	**119**	**349**
***FR5FD**	**A**	**682,670**	**1284**	**58**	**132**

SOUTH AFRICA

ZS6EZ	**28**	**2,734,464**	**4937**	**40**	**152**
ZS5NK	"	196,867	589	34	87
ZS6HO	"	1,026	18	7	12
***ZS1NF**	**A**	**156,216**	**305**	**62**	**122**
*ZS4NS	"	27,665	184	22	33
*ZS4BS	"	11,778	70	31	47
*ZS6VER	21	69,405	249	28	77

TUNISIA

3V8BB	**A**	**9,358,911**	**5050**	**154**	**545**
			(Op: YT1AD)		

UGANDA

5X1Z	**28**	**2,729,610**	**5051**	**40**	**155**
			(Op: SM7PKK)		

ASIA

ARMENIA

***EK6TA**	**A**	**2,588,089**	**3147**	**77**	**254**
***EK6CC**	**14**	**160,681**	**466**	**34**	**110**
UA9CLB	**A**	**3,429,408**	**2562**	**120**	**394**
RV9BB	**"**	**1,009,970**	**923**	**101**	**341**
RW9QA	"	814,590	954	69	246
RA9DA	"	811,008	833	94	290
UA9ACJ	"	809,930	863	86	284
RA9DZ	"	688,800	865	88	240
UA9JDP	"	628,940	1130	63	173
UA9CDC	"	284,800	363	85	235
UA9KM	"	221,960	406	75	173
RZ9HT	"	86,469	304	29	82
RZ9HG	"	16,790	127	26	47
UA9OSV	"	12,480	81	18	42
RW9HA	**28**	**647,712**	**1817**	**38**	**135**
UA9KJ	"	371,175	1121	34	113
RV9SV	"	229,568	722	32	104
UA9OS	"	166,188	601	29	103
UA9XEN	"	87,264	300	22	86
RW9SW	**21**	**410,495**	**1080**	**36**	**113**
RA9WW	"	158,100	457	36	114
RZ9UGN	**14**	**137,707**	**466**	**31**	**88**
RU9TC	**1.8**	**47,100**	**342**	**9**	**51**
UA9AT	"	24,354	190	8	46
***RJ9J**	**A**	**2,315,638**	**1909**	**124**	**403**
			(Op: RA9JR)		
***UA9CI**	**"**	**965,497**	**1082**	**89**	**288**
*UA9ZBN	"	398,748	564	78	204
*RA9XF	"	332,098	534	56	185
*UA9AX	"	266,943	393	78	225
*RA9FF	"	207,346	428	47	157
*RZ9IB	"	181,636	430	51	131
*RU9CZ	"	180,285	316	68	191
*UA9ORQ	"	159,900	343	56	139
*RX9JW	"	100,142	299	40	121
*RX9FG	"	87,780	297	31	101
*RX9WN	"	35,532	113	47	94
*UA9JMS	"	27,977	141	32	69
*RA9XA	"	8,832	57	26	43
*UA9MO	"	6,379	147	27	40
*RU9UG	"	5,325	77	18	41
*RX9AAN	"	2,752	26	18	25
***RA9FEL**	**28**	**172,102**	**588**	**30**	**93**
*UA9CL	"	67,818	272	29	84
*UA9OA	"	24,986	178	14	48
*RA9FRD	"	21,584	129	17	59
*UA9OMT	"	11,818	130	11	27
*RZ9YF	"	11,690	79	22	48
*RW9UDD	"	2,162	151	14	32
***RX9WR**	**21**	**191,552**	**747**	**36**	**110**
***RW9AB**	**14**	**268,975**	**814**	**33**	**112**
*UA9BS	"	59,800	234	27	77
*RX9UKF	"	50,332	238	27	66
			(Op: Kulik)		
*UA9CEP	"	735	20	8	7
*RA9JP	7	40,640	305	16	48
*RZ9CO	1.8	1,098	23	5	13
RAØJJ	**A**	**688,913**	**1278**	**93**	**220**
RKØSXF	**"**	**660,928**	**778**	**95**	**273**
			(Op: RUØST)		
UAØSE	"	153,793	394	61	130
UAØJDD	"	10,001	90	33	40
RUØSN	"	2,788	27	16	25
RSØF	**28**	**546,708**	**1292**	**40**	**134**
			(Op: UAØFZ)		
UAØCW	"	186,966	538	36	105
UAØWW	"	148,074	579	23	88
RAØBA	**21**	**449,208**	**1172**	**38**	**115**

*UAØYAY	A	364,800	513	85	215
*RUØLL	"	359,320	606	87	173
*RWØBG	"	280,112	483	71	173
*UAØFEN	"	4,104	57	19	19
*RAØFA	28	521,710	1453	38	107
*RZØCQ	"	68,992	280	27	71
*UAØEX	"	62,127	316	29	52
*RUØBB	"	56,700	291	23	67
*RUØSU	"	43,481	216	24	66
*UAØUAG	"	21,050	202	15	37
*UAØZS	"	1,431	26	13	14
*UAØJQ	21	461,602	1794	37	112
*UAØAPP	"	6,954	44	14	43

ASIATIC TURKEY

*TA2DS	A	588,185	823	64	204
*TA3D	28	1,065,946	2625	34	115
*TA3YJ	21	12,788	107	9	37
*TA3J	7	171,535	700	16	75

AZERBAIJAN

*4K9W	A	4,526	43	23	39

BHUTAN

A52W	A	581,776	1874	66	142
			(Op: JH1NBN)		
A52B	"	107,460	411	44	91

CHINA

*BD5RT	A	116,857	865	28	73
*BD6AA	"	26,187	196	49	80
*BA4TA	28	153,612	744	29	73
*BD5HAG	"	140,344	643	30	76
*BA4EG	"	130,758	718	29	64

CYPRUS

C4A	A	9,351,091	5467	143	504
			(Op: 5B4ADA)		
5B4YY	"	4,032,468	3724	90	306
H22H	28	2,167,488	4324	39	153
			(Op: 5B4MF)		
H2G	"	2,004,765	3964	37	146
			(Op: 5B4AGC)		
C4W	21	1,375,611	2878	38	145
			(Op: 5B4WN)		
*5B4 /GØDEZ	14	251,856	710	31	101

GEORGIA

*4L7AA	14	11,092	73	14	45

HONG KONG

VR2MY	A	907,830	1758	91	224
VR2BG	28	1,174,800	2820	40	136

INDIA

VU2WAP	A	1,569,542	1446	118	324
VU2PAI	"	1,286,915	1244	110	305
*VU2FOT	A	266,182	408	84	176
*VU3NSF	28	74,304	270	33	96
*VU3DJQ	14	77,034	311	28	83

IRAQ

*YI9OM	28	184,113	807	16	65

ISRAEL

4X6ZK	28	1,398,780	2876	38	152
4X/OL7D	"	1,237,170	2853	37	126
			(Op: OK1DTP)		
4Z1GY	14	213,715	601	32	101
*4XØF	A	1,348,082	1375	83	290
			(Op: 4Z5FL)		
*4Z5FW	21	50,466	243	25	56

JAPAN

JF1SEK	A	723,510	829	102	241
JR1LEV	"	709,382	885	104	212
JR1LQK	"	400,428	630	89	163
JF1OPL	"	271,033	480	83	134
JA1QOW	"	167,586	383	60	99
7M4KRX	"	100,880	214	71	137
7J1ABD	"	68,911	183	61	76
			(Op: WA6URY)		
JL1ANP	"	61,832	214	44	74
JH1FNU	"	61,797	219	42	72
JJ1JRH	"	8,280	81	18	22
JJ1RDX	28	383,800	946	38	114
JE1LFX	"	134,232	499	32	70
JN1BMX	"	64,375	234	33	70
JA1BBA	"	45,756	216	29	55
JA1ANA	"	11,580	68	18	42
JA1AAT	"	7,336	53	24	32
JQ1BNL	21	116,710	375	37	88
7M4BEN	14	504,173	1104	39	128
JA1BE	"	6	1	1	1
JH1RFM	7	9,164	101	18	40
*JM1LPN	A	1,008,763	1136	109	234
*7K4GUR	"	739,749	869	101	231
*JA1WPX	"	400,267	541	85	186
*JG1OWV	"	394,690	529	105	185
*JG1TVK	"	283,791	418	85	186
*JA1XUY	"	271,796	433	81	157
*JR1MRG	"	192,452	425	70	121
*JA1KK	"	98,842	268	59	97
*JA1RRA	"	97,280	302	58	94
*JA1XRH	"	80,480	185	59	101
*JA1XPU	"	75,456	222	55	89
*JH1JGZ	"	72,632	204	58	94
*JM1NHZ	"	66,300	208	48	82
*JE1UFF	"	64,566	157	56	97
*7K2GMJ	"	57,732	224	39	63
*JJ1QJP	"	54,912	168	47	81
*JN1BGP	"	42,238	163	36	62
*JE1REU	"	35,000	154	44	56
*JA1STY	"	33,462	110	50	67
*JH1RMH	"	26,048	125	27	47
*7L4PWR	"	23,400	134	34	41
*JA1CP	"	23,088	128	27	47
*JH1TUX	"	18,974	114	46	60
*JA1VBP	"	11,222	80	27	35
*JR2AWS/1	"	6,298	60	25	42
*JE1PJR	"	3,473	65	18	17
*JA1EIS	"	552	17	12	11
*JL1DUU	"	325	13	5	8
*JR4PMX/1	28	430,440	931	38	132
*7L1JHN	"	169,757	535	36	90
*7J7ACZ	"	151,659	463	34	89
*JA1BUI	"	141,848	401	36	100
*JA1VVH	"	130,647	417	34	93
*JK1OXU	"	124,186	363	38	102
*JH1CML	"	111,174	382	35	78
*JL1IHE	"	104,328	374	32	76
*JA1MYW	"	83,946	336	30	72
*JH1UUT	"	74,749	304	32	67
*JA1CQT	"	51,018	271	31	44
*JA1EMQ	"	13,053	105	24	33
*7N2UQC/1	"	8,424	73	17	35
*JA1EEG	"	3,270	44	10	20
*JH1PXY	"	555	13	7	8
*JH1NXU	"	48	4	4	4
*JA9SCB/1	21	301,490	795	39	107
*JA1SWB	"	154,375	460	35	90
*JA1MZM	"	50,490	190	31	68
*JH1BUB	"	42,800	149	25	82
*JH1FOP	"	34,709	467	27	55
*JA1YEW	"	23,068	135	23	50
			(Op: JA9-1Ø14)		
*JG1GCO	"	13,806	67	27	51
*JM3UAO/1	"	12,096	78	21	35
*JK1BII	"	11,286	82	23	31
*7K3BAD	"	10,282	81	21	32
*JQ1AHZ	"	8,085	66	20	29
*JA1JLP	"	6,405	61	15	20
*JG1TCV	"	5,160	54	20	23
*JO1TLP	"	4,017	42	16	23
*7K1EQG	"	3,404	42	15	22
*JH1KZQ/1	"	2,394	49	5	15
*JR1BSV	"	1,296	21	11	16
*7N4HMB	"	104	5	3	5
*JH1AZO	14	65,340	327	32	78
*JE1GZB	"	19,460	105	22	48
*JA1KVT	7	10,746	93	20	34
*JE1SPY	3.7	2,407	38	13	16
JA2BNN	A	1,560,214	1765	109	230
JA2FSM	"	703,508	833	115	217
JG2CNZ	"	164,836	325	84	119
JH2BTM	"	112,840	304	57	98
JA2QVP	"	30,184	110	38	60
JI2UNR	28	439,740	1199	36	105
JG2SON	"	343,269	1072	36	93
JF2FIU	"	53,900	397	23	27
JA2CWU	21	12,272	86	13	39
*JA2BQX	A	343,500	574	82	147
*JA2GHP	"	142,604	390	53	101
*JA2CUS	"	133,209	326	65	106
*JH2WHS	"	125,653	348	52	94
*JK2VOC	"	121,912	312	79	117
*JG2REJ	"	119,244	319	50	94
*JN2AMD	"	101,762	292	51	95
*JA2BEY	"	91,091	244	57	95
*JA2TKO	"	15,662	149	50	65
*JJ2TKX	"	9,869	64	33	38
*JL2LSA/2	"	3,402	58	28	35
*JG2KKG	28	300,578	861	36	101
*JF2QNM	"	190,704	620	33	83
*JG2TKH	"	65,500	252	33	67
*JA2GAL	"	32,060	177	24	48
*JA2KKA	"	18,038	77	18	40
*JG2NMY	"	17,873	103	23	38
*JF2FKJ	21	9,016	84	22	34
*JJ2SHW	"	70	6	5	5
*JR2VWY	14	18,423	104	24	45
JS3CTQ	A	3,638,071	3041	127	304
JF3CCN	"	644,400	769	107	251
JG3WCZ	"	530,362	668	104	197
JR3WXA	"	213,908	375	77	135
JA3ARM	"	117,180	261	62	118
JR3XEX	"	13,356	80	30	33
*JI3BFC	A	603,187	767	101	219
*JH3CUL	"	227,072	376	90	166
*JJ3OOZ	"	70,345	193	49	94
*JL3RDC	"	70,175	238	45	83
*JG3NKP	"	56,406	181	43	76
*JA3RSJ	"	44,444	174	46	61
*JA3UWB	"	26,076	113	31	51
*JA3WFQ	"	12,240	66	33	35
*JM3HYL	"	1,377	21	13	14
*JF3BFS	28	448,562	1158	37	112
*JA3AA	"	65,556	276	30	67
*JR3CVO	"	46,675	206	28	57
*JE3UHV	"	24,010	154	27	43
*JA3KDJ	"	17,850	85	20	50
*JR3CVJ	"	2,225	31	13	12
*JR3RIY	21	438,400	993	36	124
*JI3VUB	"	70,380	323	26	59
*JA3BBG	"	25,929	143	23	44
*JF3NDW	"	15,351	115	23	28
*JA3FZI	"	4,662	50	18	19
*JA3YPL	"	3,120	36	10	20
			(Op: Horie)		
*JR3KAH	"	576	18	6	10
JH4UYB	A	4,765,128	3269	143	398
JF4ETK	28	596,596	1632	36	107
JA4FHE	"	301,061	823	37	126
JG4AKL	"	276,535	822	34	95
JL4DJM	"	28,013	114	35	74
JA4JJI	21	35,112	174	27	49
JA4FRQ	"	1,904	32	14	20
JH4CPC	3.7	1,829	24	16	15
*JE4MHL	A	372,075	514	96	179
*JG4OOU	"	151,456	377	55	106
*JA4XHF	"	48,895	154	48	79
*JM4UZM	"	912	17	9	15
*JA4CTL	28	101,880	362	32	79
*JR4QZH	"	60,760	225	30	68
*JA4ETH	"	59,558	258	28	62
*JR4CAU	"	28,518	108	35	62
*JA4CES	"	3,390	46	14	16
*JE4GJV	"	2,870	34	16	25
*JA4AQR	21	14,632	88	20	39
JH5FXP	A	4,934,972	3282	154	399
JA5OVU	"	4,907,145	3849	131	334
JA5ATN	28	69,728	294	30	63
*JA5EO	A	381,512	772	65	127
*JF5FGY	28	27,209	110	31	60
*JA5APU	21	99,110	389	34	76
*JG5VIA	14	276	12	11	12
*JA5PDS	7	1,650	32	10	12
JQ6NAW	A	1,775,568	1556	133	293
JA6AVT	"	55,560	160	43	77
JA6BCU	"	23,014	110	31	43
JA6BGA	"	11,455	53	35	44
JA6WJL	28	561,990	1296	38	127
JA6WW	"	110,980	369	35	89
JA6AV	"	67,014	238	35	79
*JH6OPP	A	281,415	516	79	140
*JA6SRB	"	193,950	334	86	139
*JH6FTJ	"	108,514	259	54	107
*JA6AKV	"	66,296	191	60	86
*JA6JVY	"	57,771	166	53	78
*JH6CQY	"	24,896	144	12	44
*JA6IP	"	13,516	75	27	35
*JA6EFT	28	91,661	349	31	74
*JN6GBB	"	86,937	321	30	76
*JH6WHN	"	59,590	245	29	72
*JA6CBW	"	56,609	263	28	60
*JA6QDU	"	32,250	158	26	49
*JA6PL	"	23,450	136	25	45
*JL6IPK	7	1,456	28	12	14
JA7BEW	28	482,279	1251	37	111
JR7SEM	"	141,316	577	34	69
JH7XGN	21	518,916	1138	37	129
JA7BJS	"	510,896	1234	37	111
JA7COI	"	124,236	395	34	85
JA7ERJ	14	7,450	57	21	29
*JA7NVF	A	742,264	904	107	221
*JL7IFR	"	31,110	143	40	62
*JA7ARW	"	15,168	77	34	45
*JE7DOT	28	59,941	248	29	66
*JR7LVK	"	44,431	210	24	61
*JK7QYZ	"	22,977	131	25	44
*JF7GDF	"	5,379	59	15	18
*JP1JIP/7	21	171,547	521	34	101
*JH7CJM	"	31,020	106	34	76
*JR7XGL	"	22,630	118	27	46
*JA7ADV	"	15,311	97	25	36
*JO7BBS	"	1,128	21	11	13
*JA7AXP	14	160	6	5	5
JA8RWU	A	3,678,696	2649	143	361
JA8TEZ	"	61,790	198	59	72
JH8UQJ	28	85,608	291	35	81
JH8DEH	"	79,966	266	34	87
*JH8SLS	A	1,522,080	1383	122	298
*JA8CCL	"	746,198	1086	92	197
*JA8GTO	"	6,384	42	26	31
*JK8FRL	"	24	2	2	2
*JH8MWW	28	133,210	441	35	75
*JA8IJI	"	34,575	185	23	52
*JI8BUR	21	27,930	161	21	49
*JK8HOS	"	3,744	42	17	19
JH9URT	21	88,165	257	35	103
*JA9EJG	A	18,557	92	28	49
*JH9VSF/9	28	583,810	1517	37	121
*JA1ALX/9	"	45,690	218	29	59
*JR9NVB	21	223,172	619	36	109
JAØNJ	A	3,484,877	2921	129	322
JRØWZR	"	503,024	640	98	213
JAØQWO	"	273,600	423	72	168
JEØEHE	"	122,393	277	67	112
JHØFUW	28	66,248	302	30	61
*JAØBJY	A	80,388	249	50	82
*JGØGGI	"	71,550	242	58	77
*JAØBPY	"	37,674	136	49	68
*JAØRCK	"	34,686	102	53	70
*JRØGUY	"	22,750	90	33	58
*JEØVFV	"	5,936	56	24	29
*JGØIPW	"	4,092	37	20	24
*JH1BXH/Ø	28	356,076	946	37	111
*JHØNVX	"	36,501	208	26	43
*JIØCGT	"	336	15	6	10
*JAØGEY	21	17,640	132	23	37
*JHØEPI	14	152,627	460	34	94

JORDAN

JY9NX	21	1,706,550	3483	40	146
			(Op: JM1CAX)		

KAZAKHSTAN

UP4L	A	3,895,304	2862	123	409
			(Op: UN7LZ)		
UN7PCZ	28	520,352	1268	38	146
UN7JX	"	242,657	762	36	115
UN6T	"	170,178	683	29	84
UN7GDV	"	10,382	102	16	42
*UP6F	A	15,780	110	18	42
			(Op: UN7FZ)		
*UP6P	28	303,900	912	34	116
			(Op: UN6P)		
*UPØF	"	298,908	1002	31	107
			(Op: UN7FK)		
*UN7D	"	158,878	603	27	86
			(Op: UN7DA)		
*UN9LY	21	559,794	1667	37	121
*UN8FM	"	22,392	139	22	50
*UN9LN	"	10,659	106	14	43
			(Op: UN7LT)		

KOREA

HL3GOB	21	52,752	242	31	64
*HL5UOG	A	55,272	173	61	86
*DS5ARL	28	19,305	37	13	15
*DS5ACV	21	3,526	30	16	27

KUWAIT

9K9X	A	9,802,784	5295	159	542
			(Op: 9K2HN)		
9K9C	"	120,032	275	49	127
			(Op: OK1TYM)		
9K9Z	28	1,654,625	4070	39	136
			(Op: N6BFM)		

KYRGYZSTAN

EX2T	A	2,076,074	1909	99	328
EX2X	14	64,698	336	23	59
*EX8MIO	28	209,193	1162	27	76

MACAO

*XX9AU	28	3,762	127	16	17

MONGOLIA

JT1DA	21	299,754	1439	31	86
*JT1CO	28	778,008	1160	37	113
*JT1CJ	"	104,340	646	26	68
*JT1JA	3.7	6,171	134	12	21

OGASAWARA ISL.

*JD1BIA	A	39,748	393	34	42
*JD1/JHØXUP	"	2,925	45	16	23

TAIWAN

BV7FF	21	51,152	328	27	65
*BV2TL	A	157,295	689	56	107

TAJIKISTAN

*EY7AV	21	62,304	299	23	65

THAILAND

*E2ØHHK	A	1,680	20	16	19
*HS4BPQ	21	10,804	81	22	51

TURKMENISTAN

*EZ8CW	7	600	20	5	10

UNITED ARAB EMIRATES

A61AO	21	316,845	1000	36	99

UZBEKISTAN

UKØA	A	3,863,674	3180	115	363
			(Op: UK9AA)		
*UK8IG	14	67,816	284	23	75

VIETNAM

*XV9TH	28	29,032	213	25	51

WEST MALAYSIA

*9M2TO	A	914,886	1687	106	265
*9M2JI	14	11,968	84	23	45
			(Op: JK1AJX)		

EUROPE

ALAND ISL.

OHØZ	A	8,506,505	5847	141	536
			(Op: OH1EH)		
OHØBH	"	7,447,794	4732	175	603
			(Op: OH1WZ)		
*OHØV	28	611,600	1615	37	139
			(Op: OH6LI)		

AUSTRIA

OE2BZL	A	1,464,425	1796	101	374
OE5CWL	"	513,786	910	90	228
OE6Z	28	885,843	2167	39	150
			(Op: OE6MBG)		
OE3I	"	379,050	992	39	136
			(Op: OE1JNB)		
*OE1BKA	A	76,101	271	47	127
*OE3WMW	28	58,680	312	29	91
*OE1JIS	"	30,129	160	25	58

BALEARIC ISLANDS

EA6LP	A	452,565	751	81	258
EA6AEQ	28	724,302	2150	38	124
*EA6ZZ	A	525,435	910	77	268

BELARUS

EU6DX	A	140,836	366	58	199
EW6AW	"	189	23	12	15
EU1SA	28	221,628	705	34	112
EW3EW	3.7	49,262	585	15	62
EW3LN	1.8	1,128	43	6	18
*EU1PA	A	416,078	892	82	256
*EU2DX	"	139,270	471	45	145
*EW1ABF	28	16,740	187	14	37
*EU1DX	21	31,372	154	22	70
*EW8DA	"	28,482	140	23	71
*EU2MM	14	127,340	506	33	119
*EU1MM	"	21,942	139	25	81
*EU1AZ	3.7	72,048	804	15	64

BELGIUM

*ON7RN	A	780,640	1095	78	209
*ON4XG	"	351,208	636	77	248
*ON4BBW	"	161,024	307	72	184
*ON4KGL	"	160,512	454	47	145
*ON4LCY	"	102,753	399	38	109
*ON4LCW	"	93,432	387	48	156
*ON6LO	"	48,191	204	41	102
*ON4CHK	"	44,709	196	50	83
*ON4CFA	"	34,572	207	35	99
*ON5CZ	"	10,792	91	22	49
*ON4CAS	28	261,806	728	35	123
*ON4TO	"	226,708	674	37	120
*ON4LFG	"	102,459	438	29	90
*OTØH	21	389,070	1214	38	127
			(Op: ON4AAM)		
*ON4AEY	14	85,932	369	28	98

BOSNIA-HERZEGOVINA

*T95MMX	A	1,140	31	12	26
*T92M	28	40,872	266	22	56
*T94LW	21	321,760	1225	36	124
*T92D	14	545,400	2061	37	143
*T9ØU	7	27,032	562	9	53
*T98R	3.7	16,225	270	9	50
*T91EHA	1.8	6,308	162	5	33

BULGARIA

LZ5QZ	A	1,266,072	2139	98	328
LZ1NG	28	719,476	2196	40	148
LZ2RF	21	197,500	1040	29	96
LZ7G	14	787,550	2583	39	151
			(Op: LZ3ND)		
LZ2UZ	"	7,854	70	18	48
*LZ1ABC	A	824,004	1215	100	323
*LZ1HB	"	452,196	1130	83	235
*LZ2MP	"	219,062	358	76	213
*LZ5AZ	"	47,946	256	29	93
*LZ5PL	"	35,052	200	36	102
*LZ4BU	"	4,998	42	18	33
*LZ2JA	28	120,170	591	29	93
*LZ2GS	"	46,728	165	30	88
*LZ1DM	3.7	25,696	340	12	61

CORSICA

TK/IV3UHL	21	298,848	1403	33	99

CRETE

*SV9/OH4FR	28	246,519	1631	29	100

CROATIA

9A1A	28	1,835,778	3650	40	178
			(Op: 9A9A)		
9A4X	"	1,217,485	3102	39	146
9A1O	"	849,177	2057	39	150
			(Op: 9A5I)		
9A2GA	"	27,384	180	22	62
9A3GW	21	1,283,652	2842	39	158
9A1CEU	"	495	11	5	10
9A6A	14	912,582	2614	39	159
9A5Y	7	273,762	1532	28	106
			(Op: 9A3LG)		
9A6K	"	99,852	832	23	83
*9A7P	A	1,471,527	1742	106	385
			(Op: 9A6XX)		
*9A4SS	"	966,095	1083	109	336
*9A2YC	"	866,848	1297	102	310
*9A2NO	"	358,918	431	99	335
*9A3SC	"	337,492	955	54	224
*9A3IJ	"	208,170	480	64	206
*9A2KO	"	199,056	532	56	176
*9A2EU	"	155,428	410	62	182
*9A3KR	"	121,800	353	61	171
*9A3CY	"	22,032	121	35	73
*9A7D	28	665,280	1842	37	117
			(Op: 9A3HX)		
*9A5V	"	509,292	1857	31	98
*9A5AZZ	"	221,560	718	31	114
*9A1CRJ	"	3,420	40	12	18
*9A2R	21	284,856	826	37	129
*9A3B	14	506,890	1788	36	137
*9A7DM	"	286,014	1255	32	114
*9A3ZG	"	6	1	1	1
*9A1W	3.7	8,064	225	7	41
			(Op: 9A4KJ)		

CZECH REPUBLIC

OK1EP	A	1,977,688	2119	114	424
OL6R	"	762,745	1352	87	308
			(Op: OK2ZO)		

OK2HBR	"	494,760	904	82	228
OK1DXW	"	493,852	749	93	280
OK1OX	"	242,968	535	66	185
OK2PZ	"	99,091	299	54	143
OK1RI	**28**	**1,549,084**	**3330**	**40**	**172**
OK2RZ	**"**	**1,200,576**	**2767**	**39**	**153**
OK1ARI	"	183,681	528	35	121
OK2BJT	"	70,180	270	29	81
OK1RF	**21**	**948,752**	**2322**	**39**	**133**
OK1XC	"	45,600	234	26	74
OK1DUT	"	39,832	224	27	77
OK1IE	**7**	**66,975**	**373**	**22**	**73**
OK2EQ	"	22,714	300	17	65
OK1TP	**1.8**	**21,043**	**320**	**11**	**50**
***OK1DOL**	**A**	**1,260,000**	**1447**	**110**	**394**
***OK1BA**	**"**	**774,144**	**924**	**95**	**337**
***OK2SGY**	**"**	**647,900**	**965**	**95**	**285**
*OL3X	"	605,472	891	93	331
					(Op: OK1FC)
*OK1QM	"	576,032	864	83	293
*OK1DSZ	"	544,600	787	85	265
*OK1ZSV	"	466,599	829	71	286
*OK2PMS	"	463,296	986	91	290
*OK1AJY	"	411,396	718	72	230
*OK1AUP	"	342,735	720	67	246
*OK8ACS	"	335,597	706	73	250
*OK1VBA	"	311,298	563	80	227
*OK2DU	"	278,294	665	85	262
*OK1FJD	"	247,059	460	69	222
*OK2BMT	"	229,338	454	69	210
*OK2VP	"	173,888	467	55	192
*OK1HRR	"	164,749	500	52	195
*OK1FMX	"	131,124	369	51	145
*OK1DVK	"	126,348	271	73	228
*OK1AOU	"	96,401	335	51	147
*OK2KG	"	53,742	199	47	122
*OK2EC	"	43,913	233	39	100
*OK2ZV	"	36,608	148	35	93
*OK1FCA	"	33,768	214	29	105
*OK1ZSR	"	33,271	229	32	65
*OK2PPM	"	31,232	169	35	93
*OK2ON	"	30,856	199	35	81
*OK2PBG	"	29,380	129	35	78
*OK6L	"	24,522	183	27	95
					(Op: OK2SWD)
*OK1JOC	"	16,940	103	28	49
*OK1SRD	"	3,344	87	23	53
*OK2SWD	"	620	13	9	11
***OK1JN**	**28**	**136,458**	**507**	**31**	**102**
*OK2PCN	"	70,840	316	31	84
*OK1SI	"	69,871	280	27	80
*OK1FHI	"	50,576	176	32	84
*OK1LO	"	45,410	244	26	69
*OK2ZJ	"	37,335	179	21	74
*OK2BHE	"	468	17	7	11
***OK2SAT**	**21**	**187,740**	**656**	**36**	**113**
*OK1MFG	"	21,280	198	14	56
*OK1MMN	"	11,990	159	14	41
***OK1DXR**	**14**	**34,362**	**313**	**16**	**67**
*OK1AKF	"	22,752	285	17	62
*OK1TGI	7	8,352	160	11	47
***OK1FPS**	**3.7**	**33,957**	**516**	**11**	**52**
*OK2PJW	"	28,846	587	7	48
*OK2SPS	"	56	7	2	6

DENMARK

OZ1HXQ	**A**	**1,356,084**	**1726**	**98**	**319**
OZ5EV	"	447,359	576	114	325
OZ3SK	**1.8**	**47,590**	**816**	**9**	**55**
***OZ1ACB**	**A**	**392,645**	**730**	**64**	**231**
*OZ1AA	"	169,425	421	62	189
*OZ6PI	"	138,764	340	61	185
*OZ1JRL	"	132,762	432	47	127
*OZ4NA	"	78,540	219	51	159
*OZ5BO	"	67,512	393	42	152
***OZ8AE**	**28**	**221,964**	**609**	**35**	**124**
*OZ5DX	"	23,162	132	18	56
*OZ9AC	"	1,551	47	16	17
***OZ1JVX**	**14**	**29,550**	**326**	**14**	**61**
*OZ7AEI	7	3,096	102	5	31

ENGLAND

G3NAS	**A**	**2,577,064**	**2532**	**111**	**365**
MØSDX	**"**	**1,539,513**	**1804**	**115**	**398**
G3TMA	"	585,785	820	93	302
G4OBK	"	5,586	47	19	38
GX4WSM	**28**	**526,925**	**1553**	**38**	**137**
G3TBK	"	424,941	1242	35	128
G8D	"	244,416	786	36	116
G4IUF	"	79,837	265	34	114
G3UFY	"	75,488	322	27	85
G4WPD	**3.7**	**19,530**	**268**	**11**	**52**
***G6QQ**	**A**	**149,593**	**468**	**47**	**180**
***G3VAO**	**"**	**146,148**	**352**	**49**	**179**
*MØBWY	"	140,679	413	45	158
*GØVDZ	"	120,681	386	42	165
*G4DDX	"	108,878	349	47	155
*MØBEX	"	85,116	321	41	123
*G4NXG	"	11,280	64	30	50
***GØKDS**	**28**	**254,683**	**825**	**34**	**109**
*M3C	"	36,525	222	20	55
					(Op: GØVQR)
*GØKXL	"	28,435	105	27	94
*GØEYO	"	25,232	192	19	57
*MØBDQ	"	16,740	197	16	46
***M4R**	**21**	**228,463**	**878**	**32**	**119**
					(Op: G4AXX)
*G4WSE	"	171,508	861	26	80
*MØBJL	"	168,883	801	34	109
*M2W	"	115,710	730	23	91
					(Op: GØMRF)
*GØMRH	14	24,120	295	13	59
*G4VGO	1.8	10,074	5	41	0

ESTONIA

ES1QD	**28**	**184,965**	**466**	**35**	**130**
ES4RD	**14**	**133,000**	**640**	**32**	**101**
***ES6PZ**	**A**	**1,248,692**	**1464**	**106**	**418**
*ES6RHT	"	97,515	381	44	153
*ES6DO	"	60,099	175	50	151
*ES4BG	"	39,690	246	24	74
*ES6RMR	"	12,150	181	14	61
***ES6CO**	**28**	**79,422**	**323**	**30**	**92**
*ES8AAV	"	28,188	164	22	59
*ES5RGJ	"	6,888	47	13	43
*ES7FU	"	5,439	63	13	36
*ES5AGP	"	216	18	6	12
***ES5TX**	**21**	**72,098**	**366**	**27**	**91**
*ES6RHB	"	67,536	390	30	96
*ES1CN	"	62,322	361	23	79
*ES5CX	"	14,553	147	17	46
*ES1RG	"	11,457	132	12	45

EUROPEAN RUSSIA

RD4M	**A**	**2,627,168**	**2613**	**136**	**472**
					(Op: UA4LU)
RW1ZA	**A**	**2,000,271**	**2277**	**107**	**324**
UA6LJ	**A**	**1,983,847**	**1975**	**122**	**419**
RX3ARI	**A**	**1,947,730**	**2058**	**117**	**398**
RW1ZA	"	1,785,425	2225	104	321
RA3WA	"	1,597,779	1966	119	412
RZ4FA	"	1,332,540	1517	108	387
UA1OMS	"	1,097,642	1209	118	363
RK4FD	"	972,433	1355	117	394
UA4RC	"	912,540	1376	110	344
RW3RQ	"	892,552	1116	116	372
RU4HP	"	842,550	1266	105	305
RV1CC	"	635,540	742	101	329
RZ4AWB	"	628,672	1101	80	272
RK3DK	"	503,766	998	78	264
RZ1AZ	"	492,104	532	102	347
RZ3AV	"	457,434	738	92	295
RK4CN	"	312,928	596	80	228
RV6YY	"	297,360	571	75	261
RK3FA	"	263,683	576	67	204
RA3XO	"	113,940	306	56	155
UA1AJW	"	93,500	189	71	149
UA4HA	"	81,016	345	36	128
RA3RK	"	74,163	335	42	135
RU1AB	"	47,595	177	41	126
RK3WWA	"	33,408	283	49	125
					(Op: UA3WHB)
UA3AD	"	10,304	73	28	36
UA9QCP/3	"	6,762	68	23	46
UA4LCQ	**28**	**634,041**	**2147**	**39**	**168**
RV4CT	"	385,937	1363	36	131
RU6MM	"	189,072	840	35	109
UA6LP	"	64,800	361	31	77
RV6AB	"	19,270	130	21	61
RZ6FA	**21**	**469,798**	**1641**	**36**	**125**
RV3ACA	"	312,624	1176	35	121
RZ3FA	"	400	13	7	9
RA4CC	**14**	**484,480**	**1481**	**37**	**123**
RA3LZ	"	72,257	423	27	92
RN1AW	"	31,504	206	22	66
RW4PL	**3.7**	**46,750**	**384**	**19**	**66**
RA4PO	"	12,411	165	12	51
RZ3DO	"	5,840	162	9	31
***RU3QW**	**A**	**1,865,875**	**2091**	**130**	**445**
***RX3RC**	**"**	**1,251,627**	**1591**	**106**	**373**
***UA3BL**	**"**	**1,072,866**	**1348**	**107**	**382**
*RA6LBS	"	1,064,370	1299	122	388
*UA4FER	"	942,480	1396	88	286
*UA1ANA	"	882,156	1303	95	356
*RA3AUM	"	836,766	1234	91	315
*RV4LM	"	665,949	1043	92	325
*UA3ABJ	"	583,296	1062	95	297
*UA3LHL	"	547,162	865	85	289
*RZ1AU	"	493,506	866	76	257
*RV3QX	"	480,976	938	85	283
*RK3DH	"	464,145	508	116	369
*RN6CF	"	374,220	784	92	293
*RW1QM/1	"	367,950	663	83	247
*RU3DVR	"	365,010	635	84	261
*UA3TU	"	355,807	663	91	292
*UA3AGS	"	336,996	600	83	250
*RW3VZ	"	302,802	624	75	252
*UA3FDX	"	279,792	727	57	175
*UAØZDA/6	"	273,631	574	62	184
*UA1TBK	"	251,514	570	65	202
*UA3BZ	"	238,158	584	68	194
*U1BA	"	225,191	620	58	205
*RA1AR	"	205,128	643	56	203
*RW4LC	"	204,610	619	70	189
*RW1AI	"	184,464	491	60	192
*RN6AH	"	150,784	427	62	194
*RN3FA	"	132,060	267	73	140
*RX3RZ	"	115,964	424	49	163
*RA4HBC	"	111,725	400	47	158
*RA3AF	"	111,389	295	54	113
*RA3VR	"	100,531	405	51	178
*RN3AY	"	97,801	363	51	136
*RV3YR	"	94,996	347	46	141
*RA1OJ	"	80,412	359	50	93
*RU4WT	"	77,972	336	43	150
*RZ4AG	"	75,648	273	41	151
*UA1OAM	"	57,970	200	48	107
*RA6AR	"	50,337	216	38	115
*UA1AKE	"	47,495	125	53	108
*RX3DTN	"	35,250	165	37	88
*UA3XAC	"	34,365	188	40	105
*UA3QNS	"	33,264	100	45	81
*UA4FAO	"	26,496	126	46	98
*RW3TN	"	18,972	97	29	73
*UA3WW	"	18,942	111	22	60
*RW4HIH	"	18,721	119	26	71
*UA3XDS	"	12,587	112	17	24
*RX3AEX	"	11,340	118	22	62
*UA4CIF	"	10,880	99	16	52
*RK3RZF	"	7,004	74	17	51
					(Op: Finagin)
*RX3AFM	"	3,876	73	13	38
*UA3RCM	"	3,468	49	13	38
*UA3UMT	"	1,887	28	16	21
*RW3DY	"	1,127	17	8	15
*RA4NAJ	"	100	24	9	16
***RA1AW**	**28**	**193,732**	**668**	**33**	**115**
***RX3AA**	**"**	**183,690**	**782**	**33**	**124**
***RW3QO**	**"**	**181,120**	**616**	**34**	**126**
*UA3SAQ	"	180,957	718	35	112
*UA6NZ	"	101,930	399	34	101
*RU3WR	"	87,801	440	30	83
*RK3XWD	"	64,944	333	28	95
*UA4LBQ	"	56,168	298	28	90
*UA4LBK	"	46,915	312	24	74
*UA3RAW	"	33,096	227	20	64
*RU3DOG	"	32,040	197	26	63
*UA3XBB	"	30,600	223	23	67
*UA4ASE	"	29,447	340	30	48
*RX6BZ	"	26,840	119	28	82
*UA3EEN	"	16,800	108	22	34
*RN1AO	"	15,960	127	15	41
*UA3LBE	"	14,145	171	13	44
*RA4AR	"	2,106	49	11	28
*UA3YH	"	48	8	4	4
***RW3GB**	**21**	**298,400**	**1168**	**35**	**125**
*RA3DNC	"	219,620	812	37	121
***RU6FA**	**14**	**138,880**	**499**	**34**	**121**
***UA3PBE**	**"**	**132,120**	**726**	**29**	**91**
*RW1ZN	"	53,848	201	30	87
*RN6AL	"	31,941	152	26	91
*RX3DNK	"	15,587	180	14	58
*RV6AMI	"	2,580	48	6	14
*RN3AQ	"	1,488	34	7	24
*UA4LDP	"	437	14	9	10
***RN3FX**	**7**	**35,424**	**477**	**13**	**59**
*RW3DU	"	31,527	264	21	72
*UA1AFZ	"	11,774	160	11	47
*RN6BN	1.8	7,049	114	8	45

FINLAND

OH2BH	**A**	**6,156,507**	**4490**	**150**	**501**
OH6NIO	**"**	**3,207,849**	**2657**	**119**	**408**
OH3OJ	"	972,712	1503	97	301
OH3RR	"	869,414	1160	101	341
OH5NE	"	628,103	1230	87	284
OH6MSZ	"	484,155	583	104	331
OH1BV	"	483,923	785	82	237
OH3JR	"	388,740	465	92	326
OH1TV	"	317,515	490	76	177
OH1BOI	"	232,626	447	61	222
OH2VZ	"	155,805	393	57	164
OH2CV	"	15,958	96	30	71
OH3MMM	**28**	**844,220**	**2213**	**40**	**151**
					(Op: OH1MM)
OH8OB	"	14,504	103	18	56
OH1F	**21**	**986,812**	**2352**	**39**	**149**
					(Op: OH1MDR)
OH5LF	"	651,880	2126	39	133
OH7A	"	600,829	1640	39	134
					(Op: OH7MA)
OH8L	**14**	**1,006,360**	**2805**	**39**	**142**
					(Op: OH8LQ)
OH2RA	"	798,975	2452	37	122
OH2BEN	**3.7**	**61,232**	**651**	**20**	**66**
OH2BYS	"	37,505	543	11	54
OH7UE	"	18,403	342	18	59
***OH2NN**	**A**	**617,016**	**791**	**84**	**292**
***OH3WW**	**"**	**580,500**	**814**	**91**	**284**
***OH2LYP**	**"**	**579,200**	**1130**	**77**	**285**
*OH2MO	"	201,247	452	60	182
*OH1HJO	"	142,688	408	51	173
*OH7TO	"	95,424	363	55	158
*OH2LU	"	85,827	272	47	136
*OH6SU	"	58,101	169	42	139
*OH3D	"	23,095	186	38	70
					(Op: OH3HY)
*OH2EV	"	21,560	180	23	87
***OH5PA**	**28**	**44,157**	**150**	**25**	**98**
*OH6RC	"	11,461	80	19	54
*OH3OA	"	5,532	34	21	35
***OH8VJ**	**21**	**115,951**	**445**	**31**	**96**
*OH2MDC	"	6,336	107	9	39
*OH2HMB	"	8	2	2	2
***OH1LEG**	**3.7**	**30,532**	**396**	**11**	**57**

FRANCE

F5RZJ	**A**	**2,908,800**	**2237**	**143**	**497**
F5AMH	**"**	**1,952,640**	**2297**	**108**	**372**
F5BBD	"	637,608	1045	79	293
F6CWA	"	597,549	840	87	322
F5IYQ	"	291,600	661	66	174
F5RAB	"	211,149	469	54	207
F5MUX	**28**	**850,401**	**1864**	**39**	**144**
F6CLM	"	11,648	92	14	38
F5FLN	**21**	**817,974**	**2339**	**40**	**134**
F6HMQ	"	687,762	2093	38	133
F5TRO	**14**	**496,179**	**1818**	**35**	**118**
F5EMP	**7**	**64,176**	**871**	**15**	**69**
F6CTT	**3.7**	**237,393**	**1354**	**23**	**94**
***F8BDQ**	**A**	**475,647**	**847**	**76**	**255**
***F8BQQ**	**"**	**393,936**	**636**	**80**	**268**
*F5POJ	"	249,381	500	64	165
*F5ICC	"	244,818	528	63	198
*F5PVJ	"	195,888	506	52	160
*F5JBF	"	141,267	456	51	166
*F5JSK	"	101,340	382	50	159
*F5MLJ	"	49,728	198	42	106
*F6JSZ	"	39,942	226	34	92
*F5DXN	"	39,330	115	36	79
*F2FZ	"	27,285	126	26	59
*F5KDJ	"	19,082	107	25	69
					(Op: F8PMO)
*F8ATS	"	17,136	108	32	80
*F5JDG	"	12,810	108	18	52
***F5TDK**	**28**	**552,808**	**1373**	**37**	**135**
*F8BJI	"	272,700	660	40	140
*F5AJG	"	147,825	498	31	104
*F8CNR	"	114,360	487	29	91
*F8AMV	"	23,870	92	30	80
*F6IFY	"	13,320	75	20	54
***F5JY**	**21**	**133,716**	**537**	**32**	**100**
***F5ASD**	**14**	**137,326**	**797**	**28**	**91**

GERMANY

DL2NBU	**A**	**5,297,160**	**3654**	**146**	**514**
DL4NAC	**"**	**4,809,260**	**3315**	**145**	**525**
DJ4PT	**"**	**4,724,028**	**3325**	**153**	**459**
DL7ANR	"	2,319,712	2041	125	443
DL2DX	"	1,955,862	1581	140	423
DL1AZZ	"	1,004,257	1122	108	401
DL6DCX	"	967,045	1273	83	284
DJ3HJ	"	870,778	1141	96	276
DL3ABL	"	862,960	1052	98	362
DF2RG	"	786,028	1003	97	355
DJ8UV	"	682,224	1473	82	284
DK5PD	"	579,600	789	89	325
DLØSAW	"	385,098	889	73	245
DK4IO	"	379,260	664	70	231
DH9SBL	"	374,855	614	81	284
DJ4QO	"	342,063	591	65	244
DH2MA	"	331,177	721	67	186
DJ2AA	"	317,592	578	68	196
DL1DTC	"	286,286	596	71	215
DL4SKF	"	281,430	587	76	189
DL2APJ	"	259,635	411	70	215
DF3KV	"	258,648	744	35	121
DHØSP	"	257,985	636	52	193
DF9RD	"	256,542	557	67	232
DL1PT		238,795	524	76	217
DF4NR	"	238,656	553	56	208
DF1HF	"	228,661	519	59	192
DF3IS	"	227,360	536	61	184
DL1NEO	"	212,263	397	58	175
DL1ECG	"	208,754	409	66	193
DL6AG	"	190,608	369	60	168
DL1EHR	"	172,800	494	53	172
DK4LI	"	151,604	328	60	191
DL4DXF	"	138,580	305	64	141
DL2NEA	"	134,904	394	57	162
DL6AX	"	114,276	384	43	135
DL3DBY	"	99,373	285	56	162
DH9KR	"	88,247	323	44	135
DK6CQ	"	85,833	210	55	132
DL3SKF	"	74,575	244	47	110
DL2MIH	"	55,775	206	30	85
DK7FP	"	50,570	223	34	96
DL3HTR	"	32,120	209	40	60
DL4SXB	"	8,700	56	32	55
DLØCS	"	1,260	18	17	18
DKØCS	"	754	13	13	13
DL4MAK	"	676	15	12	14
DK8FD	**28**	**901,400**	**1842**	**40**	**160**
DL6UNF	"	162,110	507	33	112
DL9GFB	"	79,124	298	50	84
DK7AN	"	78,659	315	29	90
DL3ARK	"	75,645	293	30	93
DL3BRA	**21**	**63,484**	**321**	**30**	**88**
DK9WI	"	62,520	246	31	89
DJ7AA	**14**	**1,494,896**	**3415**	**39**	**169**
DL4OCM	"	2,788	49	10	31
DF1VH	**7**	**25,110**	**290**	**19**	**71**
DL4VBS	"	6,223	135	8	41
DL3LAB	**3.7**	**86,760**	**931**	**18**	**72**
DF5ZV	"	3,784	73	7	36
***DL3EA**	**A**	**1,047,137**	**1064**	**112**	**369**
***DL5ASE**	**"**	**704,675**	**1017**	**95**	**302**
***DF1ZN**	**"**	**608,972**	**797**	**85**	**279**
*DL3ZAI	"	551,208	863	73	284
*DH8AF	"	540,148	781	92	290
*DL2HX	"	528,198	769	102	351
*DL6GV	"	480,493	716	86	213
*DF3QG	"	424,320	565	103	281
*DL8NBE	"	418,619	707	91	292
*DF2FM	"	361,592	548	82	226
*DL8EAD	"	343,264	702	60	212
*DJ9MH	"	320,877	602	76	277
*DK8FS	"	317,643	491	83	256
*DH5AO	"	300,490	678	68	234
*DL8ULO	"	262,743	700	87	191
*DL2YAK	"	244,984	576	54	172
*DL2VB	"	238,612	525	64	178
*DL7UXG	"	236,544	567	63	193
*DK5DS	"	231,136	554	65	192
*DL4RCK	"	218,673	539	66	207
*DL8NBJ	"	200,895	504	66	229
*DJ2IA	"	197,208	356	73	224
*DJ3GE	"	196,464	496	54	183
*DL4DRA	"	193,648	451	65	201
*DH2PG	"	189,366	460	52	170
*DF5PP	"	163,548	500	42	156
*DL1FZZ	"	156,880	299	69	196
*DK6QW	"	148,030	342	64	162
*DL4ZBC	"	144,144	394	48	134
*DL8YR	"	140,128	302	62	170
*DF1LON	"	137,418	368	53	169
*DL7IZ	"	132,673	282	61	120
*DK5JM	"	126,294	348	52	165
*DL1AQY	"	124,299	286	65	174
*DJ2UB	"	122,731	366	52	145
*DL5RBR	"	115,620	284	59	129
*DL8HCO	"	113,628	349	49	155
*DL4JYT	"	98,616	272	53	153
*DM3XI	"	83,616	229	56	152
*DL4TE	"	80,997	277	48	99
*DL1VTL	"	77,822	289	46	121
*DL1HCM	"	70,875	263	41	134
*DL5ANS	"	64,925	215	48	127
*DL4VAB	"	45,448	199	40	125
*DK4RM	"	45,153	139	55	118
*DL3KDC	"	42,112	282	33	109
*DL8UVG	"	37,300	178	33	67
*DL5RBZ	"	36,295	225	29	90
*DL9XW	"	30,076	232	41	102
*DL8SDI	"	28,634	183	30	73
*DJ5CL	"	28,224	124	40	107
*DL4VAQ	"	27,251	115	33	86
*DL3DRN	"	25,165	150	44	133
*DL1DCJ	"	24,380	135	27	79
*DJ1OJ	"	23,052	107	38	75
*DL5OB	"	19,096	116	27	61
*DL2RZG	"	16,872	101	29	85
*DL7CU	"	15,768	114	23	50
*DM3PKK	"	15,300	92	33	67
*DK5EM	"	14,790	110	27	58
*DL6UAM	"	13,680	164	14	58
*DL7RAL	"	12,360	109	30	73
*DH5WB	"	10,380	67	25	35
*DL5MY	"	6,608	120	16	43
*DJ6QO	"	5,035	40	18	35
*DH5MFD	"	4,347	48	22	41
*DK8LV	"	2,640	27	23	25
*DL7UHD	"	1,755	32	16	23
*DF5AU	"	1,650	20	14	19
*DAØCW	"	1,188	18	16	17
*DFØNF	"	1,155	17	16	17
*DAØSUE	"	1,155	17	16	17
*DL7LZ	"	896	22	11	17
*DL1LAA	"	754	13	13	13
*DFØSTL	"	432	9	9	9
*DF2HL	"	357	9	8	9
*DH6ARM	"	100	54	17	41
***DL4YAO**	**28**	**197,684**	**597**	**35**	**111**
***DJ2XC**	**"**	**162,409**	**462**	**33**	**115**
*DA1LDN	"	154,155	568	29	100
*DL7VGN	"	93,732	390	31	76
*DL5NA	"	70,027	328	25	73
*DK9ZQ	"	66,000	344	28	82
*DL4NT	"	62,172	286	29	70
*DL6NEE	"	60,585	324	25	80
*DF6LQ	"	23,746	154	20	42
*DJØBX	"	20,822	139	17	41
*DH6JL	"	10,112	74	20	44
*DL3AMJ	"	9,699	92	15	46
*DJ7KG	"	9,450	94	16	34
*DL1FMG	"	8,955	104	13	32
*DL3TF	"	8,748	70	16	38
*DL4KUG	"	2,701	39	13	24
*DJ8OT	"	2,414	37	12	22
*DJ6XB	"	176	6	5	6
***DK2GZ**	**21**	**195,855**	**616**	**38**	**127**
*DJ2QV	"	150,858	548	36	117
*DL1EMH	"	51,688	256	27	77
*DL3SCN	"	2,716	58	10	18
***DF7YU**	**14**	**270,240**	**958**	**33**	**127**
*DL3WB	"	4,446	46	15	26
*DL2SDQ	3.7	7,344	159	6	42

GREECE

SV1DKR	**A**	**1,518,636**	**2612**	**93**	**311**
SV8CS	**1.8**	**69,660**	**804**	**12**	**69**
***J43J**	**A**	**55,284**	**423**	**23**	**79**
					(Op: DJ5JH)
***SW2A**	**28**	**626,580**	**2102**	**37**	**140**
					(Op: SV2AEL)
*SV1CQN	"	440,228	1870	35	122
***SV1DZB**	**14**	**104,181**	**791**	**27**	**94**
***SV1DKL**	**7**	**62,720**	**658**	**19**	**79**

GUERNSEY

***MUØFAL**	**A**	**94,500**	**325**	**39**	**141**

HUNGARY

HA8JV	**A**	**3,289,242**	**2976**	**142**	**529**
HG8W	"	825,384	1185	86	271
HA5JI	**28**	**883,000**	**2037**	**39**	**161**
HG4F	**14**	**257,685**	**1172**	**37**	**110**
***HA1CW**	**A**	**1,896,528**	**2055**	**123**	**459**
***HA8IH**	**"**	**1,316,904**	**1876**	**107**	**337**
*HA8LIF	"	506,220	806	92	298
*HA5BSW	"	432,564	949	86	262
*HA2QW	"	243,397	587	58	176
*HA6IAM	"	237,491	599	61	207
*HA3GN	"	135,330	420	58	130
*HA7JTO	"	116,134	510	37	129
***HG9VHF**	**28**	**161,433**	**497**	**34**	**119**
					(Op: HG9MET)
*HA8QB	"	156,217	507	36	105
*HA3GJ	"	45,773	200	31	72

*HA9MDP	21	285,289	1116	28	104
*HA5COK	"	40,330	183	24	85
*HA3TLT	"	11,526	120	14	37

ICELAND

TF3CW	14	549,807	1963	31	100
*TF3FK	A	100	3	3	3

IRELAND

EI8GS	28	496,278	1761	34	124
EI8IC	21	356,535	1370	28	111
*EI7GL	A	799,006	1164	77	312
*EI4DW	28	279,070	1173	23	95
*EI4CF	"	226,240	767	33	107
*EI6FR	21	392,657	1451	33	124

ITALY

IK4ADE	A	2,637,855	2566	113	382
IQ6T	"	1,959,488	2133	127	417
			(Op: IK6SNQ)		
IQ8A	"	1,672,648	2861	100	319
			(Op: IK8NWK)		
IZ4COW	"	1,652,544	1935	107	346
IK6JNH	"	828,723	1087	90	309
IK2DIA	"	484,225	1199	46	129
IZØBVU	"	428,238	890	93	240
IK6GPZ	"	346,462	736	60	151
IK8WTM	"	341,432	762	69	199
IV3ARJ	"	275,616	521	71	248
IKØAZG	"	271,776	802	49	103
IZ6CLN	"	234,300	586	63	157
IK2WZQ	"	234,140	423	68	162
IK8IFW	"	111,300	452	40	119
IK7UKF	"	107,520	382	55	185
IKØYUT	"	102,600	273	59	169
IK8YFU	"	95,764	341	47	131
IK2VTI	"	92,925	251	48	127
IK2VUC	"	46,530	168	50	91
IK8IOP	"	40,299	235	33	100
IZ2ADH	"	30,747	149	38	73
IK5ZTT	"	30,552	204	29	85
IK7YZF	"	20,416	137	30	58
IZ5BSA	"	2,242	50	9	29
IY4W	28	1,110,720	2564	40	155
			(Op: I4LEC)		
IQ3X	"	762,476	2085	37	135
			(Op: IV3SKB)		
IR4B	"	625,680	1562	38	138
			(Op: IK4AUY)		
IK1RLI	"	549,757	1472	35	134
IZ8ANA	"	402,280	1104	38	140
IZ2AVK	"	211,530	616	38	127
IK4QJM	"	160,398	658	30	84
IK4WMH	"	70,840	302	31	79
IK2DUU	21	857,140	2229	38	132
IK5ZTW	"	574,102	1887	37	114
IK2WZV	"	421,960	1238	37	117
IK3UMT	"	125,706	422	34	112
I6FLD	14	394,949	1377	38	125
IK2YSA	"	180,621	857	31	110
*IK4QIB	A	846,144	1239	97	319
*IK2SAI	"	666,587	997	81	266
*I3MLU	"	511,903	752	84	253
*IK6UBY	"	430,404	777	82	274
*IZ8DBJ	"	393,120	694	76	236
*IK2YDM	"	340,054	674	74	212
*II3L	"	339,365	970	59	240
*IK7WPD	"	308,812	601	68	219
*IK2XSL	"	270,072	614	57	191
*IK1RQQ	"	263,155	458	77	190
*IK8DUI	"	249,438	749	61	176
*IK3CXG	"	236,856	471	72	206
*IZ4DJZ	"	236,082	529	61	170
*I1QBI	"	213,226	486	69	209
*IZ6CUS	"	199,444	481	63	175
*IZ2BKA	"	194,733	397	57	174
*IZ8AJQ	"	170,392	428	57	179
*IZ1ANK	"	155,193	686	66	223
*I8TWB	"	152,317	399	58	169
*IZ2ABN	"	137,720	277	73	147
*IKØWHN	"	125,292	361	57	155
*IK3SSJ	"	118,881	291	61	128
*IZ1ANZ	"	104,920	326	41	131
*IQ7J	"	99,060	359	64	190
			(Op: IK7JWX)		
*IK8WEI	"	92,022	338	35	112
*IZ5BRW	"	88,340	274	43	100
*IZØCRN	"	87,584	326	38	123
*IK2WYI	"	84,956	325	33	101
*IZ2ACG	"	82,348	223	60	113
*IK8NRW	"	82,012	263	57	146
*IV3ZUU	"	74,802	297	35	102
*IR2D	"	71,208	271	45	127
			(Op: IZ2DAY)		
*IZØBXZ	"	61,336	302	36	128
*IK2RPE	"	59,388	225	41	106
*IK2RPK	"	58,947	176	46	101
*IKØVSY	"	51,012	191	41	115
*IK2REA	"	49,650	224	44	106
*IKØJRH	"	29,412	118	40	74
*IN3FHE	"	29,290	115	40	105
*I2KHM	"	29,264	190	34	90
*IZØBXT	"	25,520	116	36	80
*IV3KSE	"	23,661	119	32	67
*IV3BKH	"	23,584	125	32	56
*IØSNY	"	16,940	160	23	32
*IZ8CEV	"	16,464	156	27	71
*IZ1DFI	"	15,984	101	34	74
*IX1ALR	"	15,000	102	27	73
*IØZUG	"	11,644	101	27	55
*IK4CBM	"	9,882	97	16	38
*I2BPP	"	9,250	55	28	46
*IK2PTL	"	780	49	24	36
*I1GXV	28	363,375	149	19	51
*IK5EKB	"	300,465	851	34	131
*IU1W	"	204,680	727	34	106
			(Op: I1WXY)		
*I7FMN	"	112,332	562	29	82
*I2ARC	"	97,807	342	30	102
*IQØA	"	48,112	256	23	74
			(Op: IKØXBX)		
*IZØBTY	"	42,240	240	24	64
*IK5YJK	"	38,808	224	23	61
*IZ4CCO	"	12,749	101	19	42
*IZ8BAD	"	8,040	121	23	44
*IK2OLJ	"	5,232	68	18	30
*IR5T	21	698,202	2115	34	124
			(Op: IK5ORP)		
*IZ4AFW	"	186,912	706	28	104
*IZ8BRI	"	89,080	476	32	104
*IØTIC	"	2,812	58	10	27
*IQ7A	14	466,830	1482	38	133
*IK8YVG	"	81,875	358	29	96
*IZ8CCW	"	39,440	812	35	101
*IZ8BGY	"	32,395	323	21	74
*IQ5B	3.7	21,080	379	9	53
			(Op: I5VXG)		

KALININGRAD

*RV2FW	A	656,437	1126	89	312
*UA2CZ	"	269,555	576	84	235

LATVIA

YL2KO	A	2,656,080	2633	118	409
YL2SM	"	2,029,200	2281	120	336
YL7A	"	1,946,518	2094	124	417
			(Op: YL2GM)		
YL2IP	"	40,379	116	57	92
YL3CW	28	822,759	2137	40	153
*YL2GN	A	617,293	1067	97	282
*YL2KA	"	237,272	441	76	190
*YL2PN	"	31,992	204	29	95
*YL2GD	28	131,064	445	34	93
*YL3BZ	"	39,270	174	23	82
*YL2GTS	"	20,164	174	18	53
*YL2NK	"	7,254	77	16	46
*YL2AS	"	2,584	49	10	24
*YL2BJ	21	80,736	431	26	90
*YL1ZJ	"	10,653	104	16	51
			(Op: YL3GHD)		
*YL1ZF	14	22,646	297	14	53

LITHUANIA

LY7Z	A	4,828,784	3658	155	557
			(Op: LY2TA)		
LY6M	"	4,470,060	3904	132	448
			(Op: LY1DS)		
LY2IJ	"	3,151,491	2616	148	503
LY3BH	"	1,704,346	1854	127	426
LY2CY	"	1,398,262	1470	117	421
LY2MW	"	774,350	1184	97	328
LY2MM	"	574,351	782	89	272
LY1CX	"	338,647	818	63	184
LY4ØCX	"	219,604	505	65	152
			(Op: LY1CX)		
LY2GF	28	481,860	1364	39	141
LY4ØOU	"	285,923	844	36	132
LY3CI	"	205,200	578	34	116
LY3BX	7	102,585	880	20	85
LY3BAD	"	4,876	78	9	37
*LY4ØBA	A	2,285,716	2346	123	433
			(Op: LY2BA)		
*LY4ØBM	"	1,553,500	1971	106	394
			(Op: LY2BM)		
*LY3CY	"	419,577	885	65	258
*LY4ØKB	"	307,775	743	73	252
			(Op: LY3KB)		
*LY2FN	"	101,088	340	52	164
*LY2EC	"	91,840	316	50	174
*LY1BW	"	60,357	278	35	142
*LY2TZ	"	40,698	353	24	95
*LY1CT	"	38,550	245	29	121
*LY3CW	"	25,972	98	29	57
*LY2OX	28	185,514	550	30	117
*LY2DM	"	168,903	585	33	114
*LY2AT	"	77,140	317	32	84
*LY2BBF	"	70,950	315	23	87
*LY1DM	"	19,327	113	20	57
*LY3JY	21	132,770	594	33	109
*LY2LA	14	227,557	984	35	116
*LY3GJ	"	3,162	86	5	26
*LY4ØFW	3.7	41,331	624	11	58
			(Op: LY1FW)		
*LY1DI	"	13,992	284	7	46

LUXEMBOURG

LX2AJ	A	1,717,281	1733	126	447
LX1NO	28	572,385	1586	36	129
LX2SM	"	301,000	843	37	135
*LX1ER	A	701,568	1084	86	298
*LX1JH	"	516,086	761	89	264

MACEDONIA

Z32AM	21	423,852	1822	33	110
Z35M	3.7	1,381	41	6	23
*Z31JA	A	775,761	1257	84	273
*Z38B	"	205,425	712	55	170
*Z39T	28	181,610	829	31	99
*Z32WA	"	75,705	456	27	76
*Z31B	21	169,740	759	31	107
*Z35A	3.7	31,570	487	14	63

MALTA

*9H1DE	A	287,523	1066	49	158

MOLDOVA

ERØND	A	2,417,688	2579	119	373
			(Op: UT7ND)		
ER3HW	28	61,063	242	32	103
*ER6A	A	2,079,195	2910	109	376
			(Op: ER1LW)		
*ER5DX	"	820,512	1079	101	343
*ER3CT	"	203,315	645	62	197
*ER1BF	"	54,600	201	46	129
*ER2GR	1.8	2,898	75	7	39

NETHERLANDS

PAØIJM	A	1,078,350	1799	84	311
PAØAGA	"	1,059,428	1682	91	280
PAØRRS	"	9,922	49	34	48
*PAØRBS	A	282,051	665	57	202
*PAØMIR	"	228,165	643	34	125
*PA2SWL	"	217,272	553	61	239
*PA5CM	"	141,150	397	51	150
*PAØKDM	"	109,996	311	59	155
*PA1TT	"	72,954	229	57	136
*PA3HBI	"	17,460	99	31	59
*PA3GZC	"	15,397	101	32	57
*PA3CAL	"	10,206	52	32	49
*PAØLRK	"	9,545	80	23	60
*PAØFEI	"	7,350	95	18	52
*PA9JJ	28	115,258	410	34	109
*PAØJNH	"	57,500	325	22	70
*PA1AW	"	35,526	203	26	67
*PAØJR	"	28,900	153	22	63
*PA3ELD	14	209,667	1006	31	110

NORTHERN IRELAND

GIØKOW	28	1,641,046	3880	40	154
*GIØKVQ	A	1,382,850	1992	84	266
*GI4SIZ	"	242,730	492	59	211
*GIØOUM	"	66,230	312	36	143
*GI4SNA	21	458,458	1733	33	110

NORWAY

LA2WHA	A	379,589	827	62	195
LA1NG	"	189,329	463	63	196
LA4EU	"	139,471	401	51	160
LA7VK	"	10,760	91	17	23
LA9AU	"	594	25	8	19
LA6YEA	28	531,456	1252	40	152
*LA2HFA	A	116,624	401	47	150
*LA1PHA	"	75,040	244	45	115
*LA6HJA	"	21,851	194	25	68
*LA2MJA	28	80,721	369	27	90
*LAØGE	"	29,118	197	20	49
*LA5YV	"	8,437	64	14	45
*LA5UF	21	131,261	594	38	63
*LA4GIA	"	97,539	427	24	99
*LA5LJA	"	66,274	321	29	98
*LA6WIA	"	42,140	386	18	68
*LA7TN	"	35,112	317	17	67
*LA2DKA	14	4,922	88	13	33
*LA8WG	3.5	4,469	94	7	34

POLAND

SP9W	A	2,141,305	2481	129	416
			(Op: SP9HWN)		
SP6HTQ	"	373,425	599	79	246
SP5BB	"	282,418	472	86	249
SP2FGO	"	173,428	571	62	165
SP3CYY	"	147,894	435	42	115
3Z1V	"	124,848	322	59	145
			(Op: SP1MHV)		
SP9HZF	"	102,263	245	56	160
SP2ATF	"	76,433	291	42	137
SP2DKI	"	76,065	286	43	122
SP7EJS	"	48,787	203	22	90
SP5BNB	"	40,736	137	43	91
SP3VT	"	36,480	156	44	84
SP6TRX	"	34,560	153	44	84
SP8NR	"	20,664	80	46	80
SP9MZU	"	19,712	152	20	57
SP6YYP	"	8,740	48	28	48
			(Op: SQ6YP)		
SP4KEV	"	2,756	81	14	39
SP6YIT	"	851	13	10	13
SP6AYP	"	572	12	10	12
SP5OXJ	"	256	9	8	8
SP7GIQ	28	1,019,493	2346	39	144
SP9LJD	"	747,166	1894	36	130
SP6IXF	"	513,513	1361	39	132
SP3FYM	"	68,064	287	26	70
SP3DOF	"	23,871	147	20	53
SP2BLC	"	9,800	98	15	35
SN2B	21	1,130,025	2780	39	144
			(Op: SP2WKB)		
SP8BRQ	"	766,173	2051	39	142
SP9QMP	14	534,640	2048	36	128
3ZØMM	3.7	182,928	1545	22	81
			(Op: SP3JZR)		
SP7VC	1.8	52,992	758	10	59
SP7JOA	"	1,178	34	6	25
*SQ6Z	A	3,599,145	2709	137	468
			(Op: SP3RBR)		
*SP2DWG	"	1,138,718	1421	107	392
*SP5DDJ	"	1,040,424	1217	107	355
*SP9HQC	"	485,470	800	85	270
*SP3NUN	"	438,957	769	80	243
*SP9LAS	"	290,472	510	78	234
*SP5ICS	"	251,460	536	61	193
*SP3PL	"	210,900	491	75	225
*SQ4CUX	"	190,876	562	58	180
*SP8OON	"	173,774	497	70	175
*SP1MVG	"	157,471	436	57	199
*SP6FXY/6	"	156,373	413	61	190
*SP1HTS	"	156,299	376	64	164
*SP9NSJ	"	129,896	365	50	139
*SP4CJA	"	123,768	468	43	148
*SP2OVQ	"	123,552	388	57	151
*SN4AAZ	"	108,847	308	52	158
*SP6IEQ	"	100,109	238	56	124
*SP9XUE	"	67,830	223	57	148
			(Op: SP9XWD)		
*SQ8GBN	"	65,331	257	47	113
*SQ8FEW	"	65,108	190	46	118
*SP6RGC	"	58,646	283	36	106
*SP7JOQ	"	58,282	160	50	131
*SP3XR	"	55,515	192	46	109
*SP9FT	"	51,993	216	43	116
*SP6KFA	"	48,984	262	35	122
*SP2MKT	"	48,412	174	41	92
*3Z6V	"	26,624	139	36	68
			(Op: SP6DVP)		
*SP9LDI	"	19,000	166	25	70
*SQ9AOR	"	18,525	139	21	36
*3Z3CUG	"	15,143	270	26	44
			(Op: SP3ZAH)		
*SP7DQR	"	5,858	37	24	34
*SP6PAX	"	4,869	98	12	42
*SP7LHX	"	3,699	59	19	40
*SP9IKN	"	2,837	90	30	62
*SP9X	"	2,378	40	14	27
			(Op: SP9XWD)		
*SP9MDY	"	2,360	22	19	21
*SP6BEN	"	2,356	28	14	24
*SQ3GNA	"	2,124	239	47	130
*SP5CGN	"	1,036	25	13	15
*SP6OPY	"	561	11	8	9
*SP3LWP	28	234,643	674	37	128
*SQ9HYM	"	196,236	663	32	106
*SP5IVC	"	188,038	571	33	116
*SP5LCC	"	168,046	508	34	112
*SP9RCL	"	153,700	517	33	112
*SP6FJ	"	121,407	339	36	107
*SP3GTS	"	47,424	225	24	72
*SP6OPE	"	41,370	160	29	76
*SP7FDV	"	35,604	235	27	65
*SP8OOB	"	26,330	197	22	46
*SP2FWC	"	20,664	116	27	57
*SP9OYT	"	15,360	126	22	42
*SP6TRH	"	10,094	84	17	32
*SP9EMI	"	6,045	59	16	23
*SP6CXH	"	480	10	7	9
*3Z9XCN	21	299,884	1057	36	122
			(Op: SP9XCN)		
*SN4T	"	211,896	810	38	124
*SP9JZT	"	63,946	344	19	80
*SP2AVE	"	19,206	167	17	49
*SP8EEX	"	10,004	124	21	61
*SP2MKI	"	7,998	54	21	41
*SP9EWO	14	132,723	601	32	115
*SP2QVU	"	44,204	357	20	71
*SP4SHD	"	39,427	319	18	71
*SP3GHK/3	"	32,346	267	22	67
*SO6EDD	"	20,451	231	18	52
			(Op: DL6EDD)		
*3Z7FBQ	"	18,104	199	15	58
*SP1JON	"	11,400	168	12	45
*SP3CCT	7	28,080	338	18	72
*SP9ABU	"	24,665	178	21	77
*SP9RPW	1.8	9,504	217	6	42
*SP9BQJ	"	6,721	135	6	41
*SP5GNW	"	5,203	114	7	36

PORTUGAL

CT1EPC	A	744,504	1395	58	210
CT1AL	"	152,179	388	59	140
CT8T	28	1,357,620	3766	39	148
CT1AHU	"	331,977	1529	28	95
CT1BNW	14	49,604	313	24	80
CT2DJK	7	960	59	8	32
*CT1DSC	A	3,023,524	2984	130	451
*CT1DSJ	"	295,172	980	52	166
*CT1EWA	"	62,841	204	54	139
*CT1DJE	"	57,288	159	51	117
*CT1ELF	"	9,576	67	23	33
*CT1AOZ	28	739,028	1985	39	149
*CT2GQN	"	242,262	1317	29	100
*CT2HMN	"	63,558	341	22	77
*CT2GRV	"	35,416	228	22	54
*CT1FLD	"	28,718	220	19	55
*CT2GPT	"	20,774	229	15	46
*CT1FNT	"	15,066	139	16	38
*CS7GTP	21	72,118	370	23	84
*CT1GFK	"	5,712	50	15	36
*CT2GBK	7	11,712	110	14	47

ROMANIA

YO8MI	A	146,830	534	36	166
YO7DAA	21	115,200	687	25	95
YO4FRF	14	211,827	1174	31	100
YO4US	7	13,499	211	10	49
*YO3FRI	A	1,063,503	1412	109	350
*YP2A	"	639,492	1326	74	202
			(Op: YO2LIF)		
*YO2DFA	"	584,992	1092	87	317
*YO7ARY	"	293,632	635	62	194
*YO5PBF	"	166,772	544	53	188
*YO4KCC	"	30,888	339	18	60
*YO6AJI	"	24,960	104	31	65
*YO8COK	"	24,440	171	20	74
*YO3CVG	"	14,168	72	35	53
*YO8DHD	"	9,638	79	21	40
*YO5AEX	"	4,180	50	18	37
*YO9GJY	28	235,587	345	31	60
*YO6BHN	"	89,835	258	36	123
*YO3NL	"	51,415	199	32	99
*YO5TP	"	43,834	197	28	73
*YO6ADW	"	18,176	108	22	49
*YO7KBS	"	9,396	92	14	40
*YO4RSS	"	8,850	85	18	41
*YO3JW	21	160,704	792	35	109
*YO5KOP	"	77,748	450	26	88
*YO6FNA	"	23,736	114	27	59
*YO4BBH	"	12,719	80	20	59
*YO4BJB	"	11,700	235	14	38
*YO5BHG	"	1,075	35	7	18
*YO2BEH	1.8	7,964	210	6	38

SAN MARINO

*T77CD	28	454,584	1740	35	106

SARDINIA

*ISØIGV	A	330,940	760	61	181
*ISØCLA	"	100	14	9	11

SCOTLAND

MMØLEO	A	107,254	340	43	120
GMØAZC	28	137,195	820	29	86
*GMØFET	A	793,650	1267	78	292
*GM3BCL	"	755,758	1137	78	258
*MMØBRG	"	487,259	1017	69	224
*MM5AJW	"	268,074	596	60	221
*GMØCLN	"	59,696	258	37	127
*GM4OBK	28	46,080	261	23	67
*MM2R	"	38,976	222	19	77
			(Op: GM3YOR)		
*GM4FDM	21	508,536	1589	40	128
*GMØIIO	"	50,499	394	20	73

SICILY

IT9JOF	A	506,766	819	81	186
*IT9GAC	A	67,437	214	45	132
*IT9RYJ	21	251,328	996	33	121
*IT9STX	14	600,935	1969	34	121
*IT9ICS	"	207,792	1148	26	91

SLOVAK REPUBLIC

OM8A	A	5,614,688	4131	145	487
			(Op: OM3RM)		
OM3NA	"	2,985,794	3091	104	315
OM3IAG	"	1,042,320	1607	102	328
OM3CW	21	185,287	704	34	105
*OM6T	A	1,387,770	1881	119	382
			(Op: OM5AW)		
*OM4DN	"	452,760	821	79	264
*OM8DD	"	277,530	535	83	247
*OM7AG	"	228,501	649	54	225
*OM3PQ	"	216,504	494	59	189
*OM3YK	"	214,752	590	55	192
*OM4TX	"	181,470	500	63	200
*OM3CDZ	"	131,900	495	45	153
*OM8HG	"	60,356	271	42	116
*OM7PY	"	38,100	109	42	85
*OM6RM	"	18,240	169	19	76
*OM4KK	28	121,708	444	35	104
*OM2VL	"	76,066	220	35	111
*OM7YC	"	53,094	257	27	70
*OM3EQ	"	42,515	169	28	77
*OM5NL	21	72,257	307	29	90
*OM7JG	"	68,092	387	28	88
*OM1AVK	"	20,160	172	20	52
*OM7AB	3.7	14,310	336	8	45

SLOVENIA

S5ØA	A	5,574,590	3694	155	524
S53EO	"	1,811,775	2108	97	338
S55A	"	1,680,094	1785	113	381
S56A	"	1,585,920	1213	137	503
S58N	"	276,408	554	71	193
S58D	28	1,223,620	2757	39	154
S5ØK	"	1,041,735	2452	38	147
S53O	"	692,730	1928	39	140
S51AY	"	593,304	1411	36	141
S57NWG	"	480,657	1371	38	121
S53R	21	951,954	2405	39	135
S51MA	"	604,289	1716	38	135
S5ØL	"	592,065	1710	39	138
S52QM	"	96,266	412	31	96
S59A	14	1,061,487	2699	39	164
S58A	"	883,282	2405	39	155
S52O	7	287,670	1519	29	100
			(Op: S52RU)		
*S53EA	A	3,314,044	2657	140	486
*S51RJ	"	1,035,699	1331	105	342
*S51F	"	1,026,312	1227	92	355
*S52LW	"	818,154	1030	93	324
*S57U	"	156,499	265	77	206
*S57UYX	"	156,331	462	45	116
*S58WW	"	154,680	804	34	86
*S58J	28	425,619	1117	37	134
*S57IIO	21	546,930	1411	38	139
*S53AK	"	88,500	427	31	94
*S54ZZ	14	257,472	1073	33	116
*S54A	7	66,759	457	27	92
*S53F	3.7	48,300	712	10	60
*S51W	"	31,062	526	10	52

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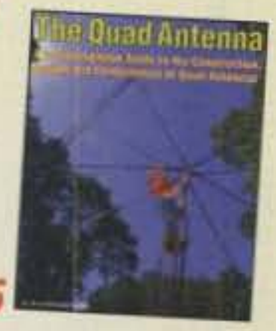

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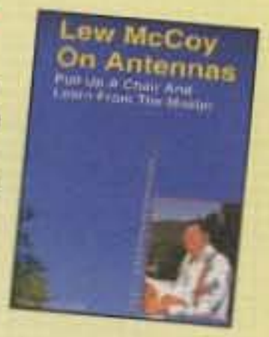

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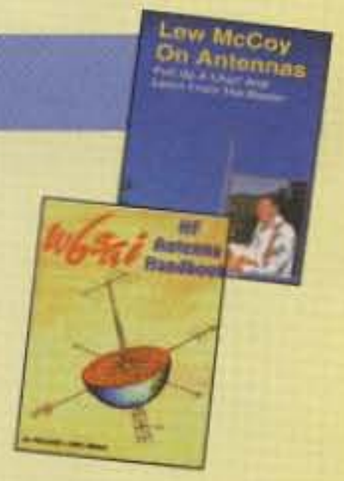

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SPAIN

EA4KD	**A**	**3,673,593**	**3134**	**125**	**442**
EA5DFV	**"**	**2,899,230**	**2891**	**106**	**376**
EA3ELZ	"	1,567,450	1679	103	367
EA1HJ	"	1,546,796	1993	88	303
EA1UX	"	1,182,930	2410	68	190
EA1DAX	"	599,430	1037	68	222
EA1YB	"	588,111	926	77	214
EA1MK	"	516,246	854	75	203
EA3AQQ	"	455,240	819	82	298
EA5EG	"	50,078	172	45	101
EA5GMA	"	41,210	185	41	89
EA4CEN	"	17,576	101	32	72
EA1DFP	"	16,362	66	41	60
EA3AEK	"	6,216	97	22	52
EA5DFX	"	4,212	102	12	27
EA3KU	**28**	**862,663**	**2048**	**40**	**157**
EA3QP	**"**	**825,528**	**2108**	**38**	**139**
EA4WF	"	388,825	1159	36	115
EA7HBP	"	210,456	1085	27	84
EA3DUZ	"	136,492	388	34	114
EA1JJ	"	105,444	462	28	73
EA3BCP	"	61,098	331	28	74
EA1QA	"	37,742	164	25	88
EA3IN	**21**	**495,001**	**1507**	**36**	**133**
EA1JO	"	119,327	508	31	106
EA3BO	**3.7**	**31,080**	**341**	**12**	**62**
EA1AUT	"	17,088	219	11	53
EA5AT	1.8	7,191	180	5	42
***EA3GEG**	**A**	**1,426,964**	**1540**	**106**	**345**
***EA3CI**	**"**	**1,099,640**	**1502**	**85**	**285**
***EA1AJV**	**"**	**894,725**	**1450**	**70**	**255**
*EA3GHZ	"	876,842	1342	90	287
*EA7RU	"	850,150	1276	81	266
*EA1BPO	"	848,704	1465	70	228
*EA4BFK	"	741,321	1346	63	224
*EA5EOR	"	710,391	1036	78	285
*EA7IA	"	635,245	926	94	283
*EA3ASX	"	579,626	802	83	270
*EA7HCU	"	522,548	817	79	259
*ED7AJR	"	403,650	807	62	208
*ED5ASF	"	345,344	685	69	235
*EA4BSC	"	299,150	510	77	233
*EA1IF	"	269,403	679	61	206
*EA1OT	"	250,210	731	51	140
*EA1ET	"	236,750	558	60	190
*EA5QB	"	231,071	580	48	171
*EA1AUM	"	226,572	542	58	181
*EA1APS	"	198,334	526	50	141
*EA3ASS	"	189,295	328	74	215
*EA3AGB	"	157,247	356	56	158
*EA5CY	"	155,820	477	57	153
*EA1NK	"	146,055	382	57	138
*EA1SH	"	136,512	400	53	163
*EA5FEJ	"	118,628	343	56	90
*EA1UU	"	114,453	617	30	11
*EA3DWU	"	98,943	359	45	132
*EA1FFC	"	94,800	247	47	111
*EA3DTQ	"	93,575	345	47	150
*EA1RH	"	90,780	405	46	132
*EA1GL	"	80,411	244	54	137
*EA4CER	"	79,103	279	38	140
*EC3ALV	"	75,660	335	33	97
*EA1HF	"	73,179	240	39	102
*EA7TG	"	72,864	160	73	111
*EA3AAW	"	70,596	281	40	108
*EA1CQJ	"	67,830	336	31	88
*EA5FWW	"	66,810	175	55	115
*EA7CWV	"	62,062	170	47	107
*EC1COU	"	53,382	313	30	93
*EA2AVM	"	48,477	200	42	101
*EA5CGU	"	46,602	133	55	96
*EA5FME	"	44,805	217	36	109
*EA2BNU	"	42,054	193	37	92
*EA7FRX	"	36,960	272	19	61
*EA5AAJ	"	36,874	180	33	70
*EA3ATO	"	32,520	167	35	83
*EA4WD	"	31,828	143	35	74
*EC3AHT	"	27,948	183	30	72
*EA4AES	"	27,494	133	44	74
*EA4BAH	"	25,960	82	45	73
*EA1FBJ	"	24,400	177	32	90
*EA7BBB	"	21,568	120	40	51
*EA1HV	"	20,580	142	29	76
*EC1ALY	"	17,381	85	28	63
*EA7ATF	"	16,756	109	39	79
*EA2BGD	"	15,330	100	28	77
*EA7MT	"	13,855	101	21	64
*EA5AFH	"	12,649	64	29	62
*EA4YK	"	11,792	94	17	27
*EA2CHL	"	11,550	124	18	35
*EA1BAW	"	10,824	66	27	39
*EA4AZJ	"	10,092	53	37	50
*EA4EMC	"	9,750	52	32	46
*EA1BXF	"	8,118	162	22	77
*EA4SS	"	8,064	131	42	86
*EA1FBB	"	7,035	45	25	41
*EC4AIV	"	5,544	86	16	40
*EC1CHX	"	2,400	29	15	17
*EA4AXD	"	1,248	121	30	66
*EA7DWJ	"	1,222	18	13	13
*EA7HCB	"	1,134	77	23	40
*EA2AOS	"	72	7	5	7
***EA7FTR**	**28**	**491,854**	**1601**	**35**	**123**
***EA1FDI**	**"**	**468,342**	**1411**	**36**	**126**
***EA7GTF**	**"**	**417,968**	**1251**	**34**	**117**
*EA3FCQ	"	323,280	1088	33	111
*EA5KV	"	203,354	851	34	113
*EA1AK/7	"	188,580	732	30	110
*EA3RA	"	174,676	857	28	71
*EA5QV	"	137,061	448	35	122
*EA7AKJ	"	135,850	736	28	82
*EA5AJX	"	88,335	376	28	89
*EA2JE	"	77,066	296	27	86
*EA5AEN	"	26,481	113	24	67
*EA5IC	"	20,713	132	20	57
*EA1CXH	"	14,820	119	15	50
*EA5AOM	"	14,350	85	21	49
*EA1BZP	"	13,851	127	15	42
*EA7BYM	"	10,380	108	7	53
***EA3BIM**	**21**	**260,709**	**1174**	**33**	**108**
*EA1BIM	"	95,886	478	29	97
*EA3KA	"	87,390	478	22	68
*EA2BLK	"	81,314	418	24	85
*EA3KT	"	70,638	344	25	90
*EC2ADR	"	69,608	450	25	88
*EA5VR	"	54,884	432	21	92
*EA1CBX	"	53,445	269	21	84
*EA5WX	"	52,985	282	21	69
*EA1BP	"	52,807	307	23	81
*EA1FFH	"	49,280	395	17	71
*EC4DFA	"	31,266	307	19	66
*EA5TN	"	26,394	177	19	70
*EC2AUS	"	25,620	225	19	65
*EA5IT	"	21,918	220	18	60
*EA1ASC	"	18,177	155	19	64
*EA4DKS	"	10,512	126	15	58
*EC3CMT	"	9,514	120	14	53
***EA3AJP**	**14**	**58,520**	**377**	**21**	**74**
*EA4APP	"	20,532	129	16	71
*EA7HE	7	304	13	4	12

SWEDEN

SL3A	**A**	**3,057,525**	**2936**	**116**	**419**
			(Op: SM3WMV)		
7S5A	**"**	**2,472,070**	**2509**	**142**	**443**
SM6WQB	"	569,036	1093	74	279
SM3BIZ	"	491,600	767	93	307
SM3LIV	"	268,794	623	64	210
7SØZ	"	235,620	515	66	189
			(Op: SMØNZZ)		
SM3AF	"	58,650	359	39	111
SM3R	"	35,015	176	37	112
			(Op: SM3CBR)		
SM3FJF	"	4,743	57	14	17
SKØUX	**28**	**809,172**	**2256**	**37**	**134**
			(Op: SMØTQX)		
7S2E	"	385,624	1445	39	133
			(Op: SM2DMU)		
SM2CEW	"	79,871	302	32	105
7S2A	"	50,752	209	25	97
SM7GUL	"	12,096	115	20	44
SMØKV	**21**	**123,299**	**528**	**35**	**109**
SM6DER	**7**	**113,190**	**655**	**22**	**83**
SM6DOI	**1.8**	**35,295**	**551**	**10**	**55**
***SM4AIO**	**A**	**710,424**	**1140**	**80**	**271**
***SM7BHM**	**"**	**466,470**	**833**	**71**	**284**
*SM2KAL	"	395,046	876	72	234
*SM2T	"	346,115	662	73	246
			(Op: SM2EZT)		
*SM7ATL	"	235,014	463	68	194
*SM7GXR	"	221,855	524	67	215
*SM2EKN	"	181,260	588	46	182
*SMØBDS	"	148,803	399	45	148
*SM3EAE	"	100,748	416	42	136
*SM5S	"	78,324	296	47	167
			(Op: SM5SIC)		
*SM7FTG	"	74,582	286	47	131
*SM7HSP	"	50,239	243	49	116
*SMØFM	"	38,654	135	47	107
*SM7BJW	"	36,952	167	37	87
*SM4TIY	"	18,126	150	29	85
*SM7XGG	"	11,324	108	24	52
*SM7CWI	"	5,293	55	25	42
*8SØW	"	4,895	75	22	33
			(Op: SMØNJO)		
*SM3RUJ	"	80	6	5	5
***7S3A**	**28**	**41,830**	**215**	**21**	**73**
			(Op: SM3CER)		
*SK4UW	"	40,806	361	22	65
			(Op: SM4JHK)		
*SM4HEJ	"	28,994	142	27	82
*SM5AJV	"	405	16	5	10
***SMØW**	**21**	**132,392**	**579**	**30**	**104**
			(Op: SMØWKA)		
*SM6FJY	"	66,088	379	26	72
***SM4W**	**14**	**66,100**	**465**	**23**	**77**

SWITZERLAND

HB2AUS	**A**	**714,402**	**1039**	**98**	**328**
HB2AAA	"	300,300	485	74	276
HB9BTI	**28**	**245,224**	**791**	**36**	**115**
HB9ACA	"	145,928	650	29	87
HB9NN	"	54,280	259	21	71
***HB9AA**	**A**	**471,870**	**817**	**74**	**247**
			(Op: HB9ARF)		
*HB2AWS	"	154,155	436	58	181
*HB9AYZ	28	29,382	150	23	60

UKRAINE

UV7D	**A**	**2,703,075**	**2705**	**132**	**443**
			(Op: UT7DX)		
UY5ZZ	**"**	**1,951,380**	**2286**	**128**	**427**
US3IZ	**"**	**1,570,550**	**2017**	**110**	**395**
UV5U	"	942,884	1257	99	329
			(Op: UX1UA)		
UR6MX	"	764,301	1471	92	229
UT5JDS	"	466,908	615	91	347
UR5E	"	318,835	548	93	248
			(Op: UR5EDX)		
UT7MD	"	121,312	281	55	168
UT4EO	"	91,390	327	47	143
UU9JFA	"	76,314	196	55	103
UT5JAP	"	46,056	124	55	97
UR5ETN	"	34,056	244	25	107
UW5Q	"	6,290	46	29	45
UR4E	"	752	250	24	70
			(Op: UR4ETT)		
EN1Z	**28**	**933,984**	**3119**	**40**	**167**
			(Op: UTØZZ)		
UT2IW	**"**	**565,824**	**1605**	**39**	**153**
EM7Q	"	435,022	1523	36	125
			(Op: UT2QT)		
EM8I	"	237,336	1048	36	109
			(Op: UT8IM)		
EN7M	"	211,974	817	34	113
UW5U	"	206,063	785	34	109
UX4UA	"	117,173	419	34	99
UT1YV	"	22,592	194	19	45
US9QA	"	9,295	129	16	49
UZ7U	**21**	**541,242**	**1783**	**37**	**125**
			(Op: UT3UA)		
UTØH	**"**	**444,132**	**1677**	**38**	**131**
			(Op: UT1HT)		
UT5RQ	"	229,596	767	37	122
U5WF	**14**	**188,960**	**684**	**35**	**125**
UR6IJ	"	141,713	589	30	113
UX6F	"	114,352	949	26	86
			(Op: US-F-Ø28)		
UX1VT	"	5,750	114	8	38
EO6F	**1.8**	**23,954**	**434**	**8**	**51**
			(Op: UXØFF)		
UR6QA	"	13,794	283	9	48
***UT1QW**	**A**	**1,038,189**	**1642**	**97**	**304**
***UZ4E**	**"**	**908,550**	**1623**	**111**	**339**
*UR2E	"	734,195	1490	93	292
			(Op: UR5EAW)		
*UR5MID	"	593,056	1044	87	257
*UX5UO	"	546,048	718	106	326
*UT5UAG	"	340,200	611	82	242
*UT5HA	"	298,875	448	93	282
*UT3QT	"	289,513	679	71	227
*UX3M	"	269,326	616	71	240
			(Op: UR3MP)		
*UT4TA	"	260,766	592	69	228
*UR5WIF	"	188,074	429	71	200
*USØYA	"	157,560	299	71	189
*UY5TE	"	147,994	490	46	171
*UT5UML	"	110,292	345	49	133
*US7IA	"	91,005	314	55	130
*UR7EM	"	79,420	320	46	144
*UU5JSP	"	75,411	298	46	143
*UT4MW	"	60,444	249	42	96
*UT1ZZ	"	51,029	224	32	90
*UR4EI	"	43,415	218	44	141
*UR4QSG	"	37,829	247	23	66
*US3WD	"	29,512	121	48	88
*UY2ZA	"	24,168	139	29	77
*UX3MR	"	14,229	144	22	71
*UT5UKY	"	13,356	98	28	56
*UZ5Q	"	5,250	66	30	45
			(Op: UY5QZ)		
***UT7QL**	**28**	**180,880**	**705**	**34**	**118**
*US5WDL	"	40,640	223	23	63
*US5EAE	"	26,659	221	21	45
*UR5XAJ	"	11,635	94	19	46
*UR5NL	"	6,962	90	18	41
***UT3RN**	**21**	**152,278**	**882**	**28**	**89**
*UR7TZ	"	117,460	579	29	98
*UR3CMA	"	83,583	504	25	86
*UT5PW	"	75,729	315	44	80
*US5QSF	"	67,818	370	27	86
*US5MTJ	"	55,188	406	31	95
*UX1IL	"	29,256	199	21	71
*UR5VZ	"	28,576	134	25	69
***EM6M**	**14**	**89,000**	**718**	**25**	**73**
			(Op: UT5MB)		
***UR4MRT**	**3.7**	**17,110**	**237**	**11**	**48**
***UX5NQ**	**1.8**	**17,160**	**349**	**8**	**44**
*US7MQ	"	728	27	6	20

WALES

GWØRYT	**A**	**401,988**	**844**	**66**	**212**
***GW4BLE**	**A**	**4,529,292**	**3373**	**126**	**461**
*MW5EPA	"	319,062	823	55	191
*GW3NJW	"	117,420	326	47	143
***GWØAJI**	**28**	**47,663**	**358**	**19**	**58**
*GW4HBK	"	26,158	163	22	60

YUGOSLAVIA

YU7KW	**A**	**1,679,711**	**1771**	**114**	**377**
YT6A	**28**	**1,156,248**	**3030**	**40**	**162**
YT7W	"	315,100	1050	33	104
			(Op: 4N7TW)		
YU7SF	"	30,176	173	20	62
YU7AV	**21**	**812,430**	**2277**	**39**	**138**
YU7CF	"	299,440	1048	37	115
YU7KWX	"	296,250	1098	33	117
			(Op: YU7SK)		
YT1BB	**14**	**654,318**	**2731**	**39**	**150**
YT7A	**7**	**238,544**	**1352**	**30**	**106**
YTØA	**3.7**	**219,112**	**1451**	**25**	**97**
			(Op: YU1FW)		
4N1A	"	142,584	1171	19	85
			(Op: YU1EA)		
***YU7AL**	**A**	**1,011,456**	**1228**	**98**	**341**
			(Op: 4N7RGH)		
*YT1AT	"	394,910	936	87	200
*YU1BO	"	77,074	322	41	143
***YU1ZZ**	**28**	**685,520**	**1763**	**38**	**138**
*YU7KM	"	50,459	246	27	67
***YU1AAX**	**21**	**71,820**	**525**	**23**	**72**
			(Op: YT1RX)		
*YU7DYZ	"	10,890	130	15	40
*YU1AAT	"	1,598	26	13	21
			(Op: 4N1MD)		
***4N7B**	**14**	**258,417**	**943**	**36**	**117**
*4N8/LZ1BJ	"	7,360	157	7	39
***YU1ACS**	**3.7**	**42,408**	**525**	**13**	**63**
			(Op: YZ1SG)		
***4N7ZZ**	**1.8**	**15,984**	**307**	**7**	**47**

OCEANIA

AUSTRAL IS.

***FOØWEG**	**A**	**12,460**	**71**	**35**	**35**

AUSTRALIA

VK5GN	**A**	**3,494,205**	**2868**	**123**	**306**
VK1JDX	"	208,582	445	73	136
VK4DMP	"	137,367	299	65	118
VK2BCQ	"	89,474	242	55	99
VK4IU	**21**	**165,100**	**590**	**31**	**69**
VK3DZM	**3.7**	**20,020**	**223**	**17**	**27**
***AX4EJ**	**A**	**1,203,124**	**2061**	**83**	**138**
*VK3OJ	"	49,692	246	28	54
***VK2ARJ**	**28**	**479,987**	**1601**	**33**	**79**
***VK4UC**	**"**	**431,900**	**1094**	**36**	**104**
*VK8DK	"	100,362	444	29	57
*VK2HV	"	87,087	422	27	50
*VK2EM	"	45,990	266	25	45
***AX8HZ**	**21**	**373,932**	**1183**	**36**	**105**
***VK4EMM**	**14**	**667,056**	**1533**	**36**	**120**
***AX3TZ**	**7**	**36,096**	**216**	**24**	**40**

BELAU

T88QG	**A**	**753,675**	**1430**	**71**	**124**
			(Op: JA1QGT)		
T88WX	**28**	**966,884**	**2469**	**36**	**103**
			(Op: JA1WSX)		

BRUNEI

V8A	**21**	**1,773,756**	**3610**	**38**	**136**
			(Op: JO1RUR)		

EAST MALAYSIA

9M8R	**A**	**7,091,763**	**4326**	**153**	**444**
			(Op: W7EJ)		

FRENCH POLYNESIA

***FOØFRA**	**A**	**129,898**	**441**	**46**	**61**
			(Op: CT1EAT)		

GUAM

KH2/W7LP	**21**	**359,579**	**1360**	**31**	**66**
KH2/KHØR	**14**	**253,800**	**880**	**33**	**75**

HAWAII

KH7R	**A**	**11,894,730**	**7473**	**170**	**392**
			(Op: CT1BOH)		
AH6OZ	"	2,831	73	11	8
AH7C	**21**	**383,418**	**924**	**37**	**116**
WH7/N6ND	"	163,134	526	36	78
KH6FKG	**7**	**142,419**	**818**	**24**	**44**
KH6CC	**1.8**	**1,001**	**52**	**6**	**5**
***KH6GMP**	**A**	**1,014,244**	**1984**	**67**	**111**
*KH6/KT7G	"	6,952	62	21	23
*KH7L	28	15,778	125	22	27

INDONESIA

YCØKTQ	**A**	**503,706**	**977**	**55**	**146**
YB8BHC	**"**	**463,670**	**751**	**79**	**154**
YBØHD	"	132,220	266	67	153
YBØHXH	"	39,744	321	23	31
YBØABB	**21**	**655,976**	**1669**	**39**	**128**
***YBØLBK**	**A**	**502,060**	**764**	**92**	**168**
*YCØIEM	"	20,984	112	35	51
*YC3IZK	28	31,350	189	25	41
***YBØAZ**	**21**	**572,588**	**1267**	**39**	**133**
*YC2VTO	"	23,220	121	28	62
*YB2UJY	"	14,960	90	27	53
*YC2VMS	"	7,320	67	21	39
*YCØQO	"	4,361	46	21	28
***YB2LAB**	**14**	**302,186**	**935**	**33**	**106**

NEW CALEDONIA

FK8HC	**A**	**822,292**	**1275**	**82**	**159**
***FK8GM**	**7**	**140,580**	**837**	**28**	**43**

NEW ZEALAND

ZL1ANJ	**A**	**1,398,012**	**1446**	**109**	**248**
ZL2AL	"	912,198	1296	96	163
ZL3JT	**21**	**79,800**	**236**	**36**	**104**
*ZL1TM	A	21,850	90	36	59
***ZL1CDX**	**28**	**46,665**	**409**	**20**	**31**

NORTH COOK ISL.

ZK1NJC	**A**	**292,338**	**958**	**49**	**60**
			(Op: JI1NJC)		
ZK1NDK	28	14,136	304	10	9
			(Op: JR2KDN)		

NORTHERN MARIANAS

KHØCE	**A**	**579,904**	**1022**	**82**	**126**

PAPUA-NEW GUINEA

P29CC	**A**	**1,463,676**	**1892**	**90**	**193**

PHILIPPINES

DU9RG	**A**	**3,239,659**	**2686**	**140**	**303**
DU3NXE	"	27,380	147	33	41
*DU1DX	28	39,596	206	24	52

TUVALU

***T2DX**	**A**	**133,032**	**322**	**75**	**109**
			(Op: W4WET)		

SOUTH AMERICA

ANTARCTICA

EM1U	**A**	**304,911**	**596**	**67**	**140**

ARGENTINA

LU6EBY	**A**	**2,066,820**	**2040**	**106**	**274**
			(Op: LW9EUJ)		
LU4MCS	"	1,035,440	1404	73	207
LU1BR	"	925,462	1375	80	198
LU6EQV	"	28,130	162	40	57
LU1DZ	"	17,390	93	22	52
LU1HF	**28**	**1,631,490**	**3853**	**37**	**133**
L2F	**"**	**1,151,292**	**3370**	**34**	**114**
			(Op: LU9FDG)		
LW7DX	"	906,675	2183	34	123
LW8EXF	"	357,582	1082	29	93
LU6YAR	"	273,948	979	25	86
LU4DJC	"	100,298	470	25	69
LO7H	**21**	**624,994**	**1776**	**32**	**105**
			(Op: LU7HN)		
LU7H	"	215,415	628	32	98
			(Op: LU2HAO)		
LU4FM	**14**	**1,065,843**	**2354**	**36**	**135**
LU7YS	"	799,744	1781	38	138
LU4IC	"	397,575	1098	32	103
LU6FAZ	**3.7**	**8,619**	**123**	**16**	**35**
LU1VM	**1.8**	**429**	**32**	**7**	**6**
***AY5E**	**A**	**1,366,596**	**1668**	**81**	**227**
			(Op: LU5DV)		
*LU1FF	"	846,300	1140	85	225
*LU1BJW	"	425,462	832	62	137
*LU1VEW	"	388,908	1349	27	81
*LU7DR	"	333,009	829	47	116
*LU9JTC	"	140,130	347	53	109
*LU1ARV	"	104,122	263	53	105
*LU8DW	"	87,596	367	42	80
***LU4DX**	**28**	**1,003,704**	**2275**	**35**	**121**
***LU3HIP**	**"**	**958,782**	**2347**	**32**	**114**
*LU5EVK	"	391,760	1194	27	91
*LW7EIC	"	377,928	1230	27	89
*LU8ADX	"	358,236	1031	30	94
*LU2EC	"	329,832	1095	27	81
*LW1EGD	"	323,085	1336	26	79
*LU9HNQ	"	257,187	1118	30	81
*LW9EOC	"	214,488	833	27	81
*LW5HBE	"	150,579	653	28	71
*LU7VFJ	"	125,500	538	24	76
*LU2DKN	"	112,395	325	28	99
*LW7EGO	"	109,338	447	24	69
*LW8DXJ	"	86,802	476	18	56
*LU5JKG	"	82,320	352	26	72
*LU4DZ	"	67,680	387	24	56
*LU1HK	"	48,564	233	24	58
*LU8HYR	"	47,911	242	23	55
*LU4HXJ	"	47,558	237	22	64
*LW6EQG	"	38,272	242	20	44
*LW8ER	"	136	57	15	19
***AY1I**	**21**	**1,396,415**	**2767**	**38**	**143**
			(Op: LU7DW)		
*LU2BA	"	621,639	1529	34	119
*LP2F	"	376,789	1593	33	100
			(Op: LU2FT)		
*LU4DA	"	304,436	966	30	91
*LW5DX	"	196,020	754	29	81
*LU1MD	"	163,823	550	30	84
*LU4HKL	"	3,808	53	11	23
***LOØD**	**14**	**519,367**	**1763**	**35**	**102**
			(Op: LU1DK)		
*LU8VCC	"	252,434	837	34	99

ARUBA

PØØB	**A**	**10,450,656**	**6880**	**141**	**413**
			(Op: P43P)		
PØØA	**14**	**1,923,646**	**4222**	**38**	**140**
			(Op: KK9A)		
***PØØP**	**A**	**8,747,520**	**5944**	**133**	**377**
			(Op: W5AJ)		
***P43E**	**"**	**5,440,770**	**3992**	**111**	**375**

BOLIVIA

CP6XE	**A**	**979,394**	**1633**	**74**	**197**
CP6UA	"	553,308	1096	57	139

BRAZIL

PW7BZ	**A**	**3,005,100**	**2740**	**109**	**311**
PR2G	"	650,700	1029	73	168
			(Op: PT2ADM)		
PR7FMT	"	72,174	384	44	94
PY1NX	"	55,986	246	30	56
ZW2C	"	41,192	167	51	101
			(Op: PT2CMN)		
PY2FUS	"	35,178	98	59	84
PT2TF	"	12,331	85	23	36
PS8ET	"	7,800	53	27	51
PR7SD	"	100	47	24	30
ZX5J	**28**	**3,008,866**	**5524**	**40**	**163**
			(Op: PP5JR)		
ZX4Y	"	1,183,518	2475	39	147
			(Op: PY4OY)		

PY2SBY	"	528,272	1485	30	107
PW2A	"	241,200	616	33	117
PY5M	**21**	**2,439,954**	**4313**	**40**	**158**
					(Op: N6TJ)
PP5JD	"	955,479	2196	35	138
PP5UA	"	346,492	1296	29	87
PQ5W	**14**	**678,937**	**1984**	**34**	**127**
					(Op: PP5WG)
ZV8O	**7**	**55,980**	**350**	**18**	**42**
					(Op: PV8DX)
***ZX2B**	**A**	**3,832,812**	**3234**	**104**	**310**
					(Op: PY2MNL)
***PY2YU**	**"**	**3,156,234**	**2744**	**113**	**313**
***PY2NY**	**"**	**2,768,238**	**2726**	**95**	**274**
*PY5HSD	"	956,630	1399	72	199
*PP2RON	"	528,827	788	67	180
*ZV5V	"	235,616	520	59	140
					(Op: PP5VB)
*PY7ZY	"	216,464	507	42	124
*PT2AW	"	209,405	511	50	105
*PY2RAF	"	196,560	393	61	128
*PQ7Q	"	127,820	311	57	109
					(Op: PY7IQ)
*ZY5S	"	100,980	323	65	139
					(Op: PY5GVC)
*PY2DJ	"	96,036	315	56	103
*PY2AER	"	87,431	266	41	98
*PY2PT	"	84,364	264	53	108
*PY7YL	"	68,382	209	47	84
*PT2OI	"	60,000	210	47	103
*PP8EB	"	58,644	222	40	68
*PT7ZAA	"	50,197	283	17	54
*PT2HF	"	38,784	150	39	89
*PW7Z	"	34,375	214	43	82
*PY1WAG	"	29,760	121	38	58
*PT2PC	"	25,200	106	41	79
*ZV8I	"	20,300	289	14	14
					(Op: PV8IG)
*PY2SRL	"	10,465	63	32	33
*PP5AM	"	8,349	43	27	42
*PY1AFS	"	5,704	58	18	28
***PP4K**	**28**	**518,700**	**1296**	**34**	**106**
					(Op: PY4BK)
***PY2OF**	**"**	**506,152**	**1311**	**36**	**115**
***PY2LED**	**"**	**399,399**	**1186**	**31**	**102**
*PY2XAT	"	388,056	1076	36	116
*PS7HF	"	344,424	1104	31	96
*PY5JO	"	220,752	851	27	85
*PY4DBU	"	211,468	705	31	85
*PY3AN	"	171,716	673	25	75
*PU2PGR	"	136,332	530	32	94
*PP5CN	"	120,120	440	27	83
*PY2NDX	"	110,760	435	29	75
*PS5S	"	89,354	426	23	63
					(Op: PP5MQ)
*PU2YDX	"	79,079	390	17	60
*PY2KPY	"	67,774	333	31	72
*PY2EDY	"	57,768	381	22	36
*PT2/KC2BAA	"	56,547	356	15	46
*ZY2W	"	53,675	237	28	85
					(Op: PT2ND)
*PR7FN	"	42,148	250	20	62
*PU2WDX	"	37,024	203	24	65
*PU2TES	"	33,300	222	24	55
*PY1ZT	"	18,344	310	20	45
*PY3DJB	"	13,420	89	21	40
*PU5CMA	"	11,460	108	19	41
*PY7VI	"	11,385	116	19	50
*PY2TST	"	11,110	99	18	37
*PU7ENW	"	10,584	113	10	32
*PY3AJB	"	10,094	95	17	32
*PU2VYT	"	7,208	95	16	18
*PU8PYK	"	5,424	48	12	36
*PY7BR	"	1,640	39	14	26
*PU7EUA	"	1,302	38	11	20
*PY2LEU	"	588	20	5	9
*PU7EEL	"	100	12	6	11
***PY2P**	**21**	**789,150**	**1902**	**34**	**116**
					(Op: PY2TO)
*PY2NW	"	259,740	774	30	100
*PY3FBI	"	105,412	415	30	71
*PY3PA	"	1,508	31	13	13
*PY3ASM	"	1,160	49	10	10
*PY4NF	"	336	11	7	7
***PR7AR**	**14**	**65,790**	**311**	**23**	**63**
*PS8DX	"	35,280	178	18	62
*PY5DC	"	11,592	83	19	37

CHILE

CE8EIO	**A**	**2,400,213**	**2696**	**90**	**233**
CE3CDV	"	169,676	395	54	115
CE3F	**28**	**2,170,084**	**4372**	**39**	**155**
					(Op: CE3FIP)
CE3BFZ	"	787,712	2074	31	105
CE4FXY	"	692,874	2090	30	96
CE6ABC	**21**	**549,918**	**1768**	**32**	**105**
*XQ5CIE	28	20,416	138	20	44

COLOMBIA

HK6KKK	**A**	**4,261,704**	**3496**	**122**	**370**
***HK3PXA**	**A**	**1,946,525**	**2154**	**82**	**261**
*HK6BRK	"	9,945	51	21	44
***HK3JJH**	**28**	**802,169**	**2201**	**29**	**110**

EASTER ISL.

***XQØY**	**A**	**3,189,132**	**3447**	**85**	**239**
					(Op: KD6WW)

ECUADOR

***HC1OT**	**A**	**4,294,830**	**3276**	**115**	**363**
***HC1JQ**	**28**	**1,158,488**	**2280**	**37**	**142**

FALKLAND ISL.

VP8ON	14	13,860	124	18	24

FERNANDO DE NORONHA

PYØFF	**7**	**575,910**	**1608**	**31**	**104**

GALAPAGOS ISL.

HC8A	**A**	**18,122,040**	**9160**	**163**	**547**
					(Op: N6KT)

PARAGUAY

ZP5CGL	**A**	**364,720**	**758**	**62**	**126**

PERU

OA4SS	**28**	**814,755**	**2039**	**31**	**114**

SURINAME

PZ5JR	**A**	**7,066,624**	**4791**	**141**	**395**
					(Op: OHØXX)

TRINIDAD & TOBAGO

9Y4NZ	**14**	**1,757,349**	**3529**	**36**	**147**

URUGUAY

CV5H	**A**	**1,364,620**	**2188**	**81**	**229**
					(Op: CX3CY)
CX7ACH	**28**	**708,890**	**2024**	**28**	**105**
CX2SA	**14**	**224,548**	**588**	**36**	**110**
CX8CP	**7**	**80,746**	**458**	**27**	**67**
***CX9AU**	**A**	**1,436,838**	**1586**	**102**	**236**
*CX4SS	"	176	8	8	8
***CX1AA**	**21**	**259,280**	**888**	**28**	**84**
					(Op: CX8AT)

VENEZUELA

4M5E	**A**	**1,241,935**	**1365**	**90**	**233**
					(Op: YV5NWG)
YW3B	"	441,255	638	67	200
					(Op: YV3BKC)
YV4AZF	**14**	**88,773**	**393**	**24**	**62**
YV1DIG	**1.8**	**9,603**	**133**	**9**	**24**
***YV7QP**	**A**	**195,804**	**454**	**58**	**131**
*YV5JBI	"	128,925	222	59	166
***4M5I**	**28**	**136,595**	**599**	**23**	**62**
					(Op: YV5ENI)
*YV4FZM	"	135,000	569	26	74
***YV1CR**	**3.7**	**5,061**	**145**	**9**	**12**

QRP

P4ØW	**A**	**5,097,780**	**3599**	**127**	**381**
					(Op: W2GD)
KP4KE	**"**	**2,027,706**	**2871**	**90**	**241**
KR2Q	**"**	**1,507,506**	**1181**	**104**	**358**
F5BEG	**"**	**1,138,936**	**1253**	**103**	**369**
N6MU	**"**	**1,020,936**	**898**	**118**	**294**
LY1DT	**"**	**963,356**	**1286**	**100**	**357**
ON/NØKE	**"**	**756,958**	**1015**	**93**	**328**
LY2FE	**"**	**668,338**	**1077**	**80**	**294**
JR4DAH	**"**	**621,160**	**815**	**98**	**195**
NØHJZ	**"**	**537,716**	**582**	**96**	**262**
WK2G	"	488,592	648	83	241
SM3C	**"**	**483,144**	**872**	**67**	**261**
					(Op: SM5CCT)
YU1KN	**"**	**460,368**	**848**	**75**	**278**
UU4JO	**"**	**459,869**	**965**	**91**	**235**
YU1LM	"	458,126	991	65	249
S59D	**"**	**386,568**	**719**	**85**	**279**
YO8WW	**"**	**331,004**	**605**	**94**	**238**
LU1VK	**"**	**327,096**	**501**	**81**	**183**
WØMHK/2	"	307,639	484	66	192
N1TM	**"**	**286,512**	**422**	**70**	**212**
WA3NKO/4	**"**	**278,864**	**431**	**59**	**173**
KKØQ	"	241,744	447	73	159
ON7CC	"	143,451	465	49	182
VE4COZ	**"**	**136,882**	**324**	**56**	**122**
CT1DYV	**"**	**119,800**	**305**	**53**	**134**
RA9XX	**"**	**107,400**	**391**	**33**	**117**
I3MDU	**"**	**96,425**	**348**	**43**	**132**
RZ3QY	**"**	**76,916**	**349**	**33**	**131**
G3FNM	**"**	**74,734**	**351**	**33**	**125**
NM1K	"	72,380	168	45	109
GWØVSW	**"**	**53,949**	**254**	**33**	**114**
N2WG	"	53,515	161	42	97
EC4ABH	**"**	**52,403**	**286**	**36**	**103**
N9CIQ	**"**	**35,682**	**126**	**41**	**73**
NQ7Q	**"**	**32,752**	**128**	**30**	**59**
NQ7X	"	30,397	146	45	68
N8XA	**"**	**18,224**	**142**	**45**	**91**
GM4ELV	**"**	**15,732**	**253**	**32**	**106**
DL5IAM	**"**	**14,787**	**158**	**24**	**69**
W4DEC	"	13,182	76	29	49
SP6SOX	**"**	**12,382**	**137**	**15**	**74**
UR5YDX	"	11,410	119	18	52
DL6MHW	"	11,152	80	26	56
IKØMPI	"	9,213	102	23	60
DH2UL	"	8,520	69	23	37
WZ2T	"	8,192	56	22	42
RA4UAT	"	7,808	54	24	40
YCØLOW	**"**	**7,504**	**49**	**27**	**40**
UR5YEZ	"	6,042	86	13	44
UA9AKO	"	5,940	39	19	35
K9FOH	"	4,251	109	17	22
W3TT	"	3,528	34	20	29
					(Op: N9GG)
W2JEK	"	3,108	35	13	29
PA9RZ	"	2,145	26	15	18
DHØJAE	"	1,596	26	12	16
OM6RK	"	1,058	69	9	37
IKØQJO	"	882	16	9	12
YO4AAC	"	96	8	5	7
TR8IG	**28**	**615,462**	**1702**	**33**	**101**
LU7VCH	**"**	**247,968**	**747**	**26**	**97**
EA2CAR	**"**	**230,426**	**689**	**32**	**119**
K8ZT	**"**	**84,016**	**276**	**27**	**91**
SP4GFG	**"**	**77,172**	**267**	**32**	**112**
VA3JFF	**"**	**69,642**	**261**	**24**	**82**
HAØGK	**"**	**64,672**	**351**	**25**	**61**
OH7FF	**"**	**60,976**	**356**	**26**	**77**
I1BAY	**"**	**57,630**	**293**	**24**	**78**
OK2ZAW	**"**	**55,146**	**263**	**29**	**72**
LW7DQW	"	50,078	293	21	52
9A2EY	**"**	**42,900**	**313**	**20**	**55**
W7/JR1NKN	**"**	**35,425**	**207**	**23**	**42**
OH5NHI	**"**	**32,277**	**210**	**22**	**65**
JA3LFK	**"**	**30,504**	**175**	**24**	**38**
LU2HNP	"	28,804	156	23	53
LU1HN	"	26,910	182	25	44
VA3SB	"	23,400	119	17	55
WAØVBW	**"**	**23,370**	**102**	**21**	**61**
ES6MO	**"**	**23,200**	**105**	**22**	**78**
LU7WW	"	10,850	119	20	42
YO3III	**"**	**9,796**	**91**	**16**	**46**
JA4AKN	**"**	**8,772**	**74**	**18**	**25**
EC5ACA	"	6,273	96	11	30
UR5NNG	"	4,992	94	13	39
YO9CXE	"	4,284	71	14	37
IK1ZYW	"	1,829	37	11	20
YO6QCM	"	1,625	40	7	18
UR5FCM	"	900	26	7	13
7K2PBB	"	777	15	11	10
DLØMFL	"	714	20	7	14
					(Op: DL2JRM)
JA6GCE	**21**	**152,320**	**469**	**34**	**94**
LU1FNH	**"**	**139,708**	**506**	**29**	**77**
KØAV	**"**	**118,300**	**333**	**31**	**99**
F6HLC	**"**	**117,306**	**450**	**31**	**102**
EA7ANM	**"**	**89,271**	**628**	**20**	**71**
JL7BRH	**"**	**85,657**	**309**	**33**	**76**
W6QU	**"**	**78,016**	**279**	**28**	**78**
					(Op: W8QZA)
YT1CS	**"**	**76,190**	**462**	**24**	**87**
OK1GW	**"**	**74,237**	**315**	**33**	**87**
YL2PP	**"**	**34,505**	**193**	**23**	**80**
JH3DMQ	**"**	**29,868**	**151**	**26**	**50**
PY2QD	**"**	**27,260**	**193**	**23**	**35**
EC3AMA	**"**	**20,532**	**198**	**16**	**60**
JI8GZS	"	18,340	100	23	47
WA6FGV	"	12,699	102	19	32
OK1AIJ	"	8,096	121	9	37
DL1DQY	"	5,664	54	19	40
JN3MUC	"	323	12	7	10
WB2BHC	**14**	**64,624**	**232**	**23**	**89**
W6CN	**"**	**44,520**	**164**	**29**	**76**
N4IJ	**"**	**38,223**	**164**	**23**	**70**
SP3BLT	**"**	**32,032**	**244**	**20**	**71**
VA3TTT	**"**	**30,855**	**163**	**22**	**63**
HA1RS	"	8,512	120	10	46
K4FB	"	3,978	46	20	31
YO9AHX	"	3,441	72	9	28
IK1GKE	"	1,150	69	8	38
UN7FZ	**7**	**16,359**	**126**	**15**	**42**
Z31GB	**"**	**6,273**	**101**	**8**	**43**
N7IR	**"**	**4,181**	**50**	**14**	**23**
OK1IF	"	3,280	83	5	36
UA1ATN	"	144	11	3	9
LY2QN	**3.7**	**6,390**	**144**	**6**	**39**
ES6RFC	**"**	**1,242**	**52**	**5**	**22**
IK5WGK	"	588	25	3	18
YU1RA	**1.8**	**4,770**	**110**	**6**	**39**
W8QZA/6	"	16	5	2	2

ASSISTED

NORTH AMERICA

UNITED STATES

KI1G	**A**	**6,092,863**	**3008**	**165**	**586**
KS1L	**"**	**5,396,475**	**2956**	**145**	**520**
N1DG	"	2,766,232	1552	146	512
K1AM	"	2,343,861	1420	132	471
NR1DX	"	2,341,350	1417	137	468
N1AU	"	2,323,638	1688	110	391
					(Op: WC1D)
AA1V	"	2,189,005	1325	136	459
K1JE	"	1,912,540	1313	117	415
W1NG	"	1,834,888	1072	148	490
N8RA/1	"	1,795,426	1238	117	412
W1NT	"	1,749,000	1364	103	397
K1LI	"	1,570,550	1263	117	388
K1HI	"	1,559,040	1174	112	400
W1QK	"	1,542,192	1106	120	414
N1DD	"	1,415,042	1052	114	400
K1VV	"	1,403,728	1114	109	363
K1OA	"	1,366,755	1000	104	385
N1JP	"	1,356,810	1072	112	385
W1LLU	"	1,318,921	1142	106	355
N1NQD	"	1,234,824	824	128	424
WC1M	"	1,217,073	1073	114	315
K1NU	"	1,189,920	921	109	371
NZ1Q	"	1,171,764	956	108	376
WO1N	"	1,159,837	916	110	359
K1RV	"	1,107,624	904	105	351
W1WEF	"	1,047,015	921	113	326
K2TE/1	"	927,696	804	106	356
KX1X	"	869,060	870	84	296
NQ1K	"	868,985	707	109	352
W1RY	"	834,169	797	104	339
KE1IH	"	766,548	740	89	309
K1GU	"	748,140	732	91	279
WV1M	"	690,696	632	106	318
W1JR	"	614,957	561	113	300
K1TS	"	601,758	721	74	229
K1JN	"	599,403	610	84	273
K1TW	"	557,100	646	73	227
W1BIH	"	500,352	531	96	288
W1EQ	"	460,500	573	69	238
KE1KD	"	422,162	478	84	254
K1BD	"	392,607	450	83	250
K1ST	"	375,459	352	93	306
K1TEX	"	330,669	387	76	257
WA1ZYX	"	195,324	290	64	182
KV1J	"	192,166	303	69	178
NM1W	"	180,072	296	68	176
WJ1Z	"	177,606	303	73	180
KC1F	"	123,370	262	45	124
K1KU	"	120,960	227	66	158
AA1QD	"	90,138	196	34	132
W1WDK	"	81,337	205	49	114
W1YK	"	65,240	186	43	97
					(Op: N2YHK)
NC1N	"	56,892	161	39	93
W1AZ	"	9,408	60	24	40
K2NG	**A**	**5,593,346**	**2580**	**171**	**626**
K2XA	**"**	**4,869,282**	**2427**	**158**	**568**
W1GD/2	**"**	**3,899,705**	**2018**	**149**	**536**
W2GDJ	"	2,716,776	1685	134	448
KF2O	"	2,256,475	1282	149	506
W2WB	"	2,005,400	1470	130	412
W2YC	"	1,909,244	1224	140	464
W2TV	"	1,855,632	1199	127	450
K2TW	"	1,666,848	1127	121	416
N1RK/2	"	1,600,620	1140	117	398
K2TR	"	1,539,792	1034	136	442
K2BX	"	1,485,409	1101	108	385
K2ONP	"	1,397,046	1066	123	395
AA2WN	"	1,359,193	1094	111	406
N2WKS	"	1,207,296	902	134	378
W2RD	"	1,058,538	761	128	405
N2CY	"	1,015,542	837	100	346
AA2MF	"	1,006,226	882	107	351
K2XF	"	846,756	819	90	297
W2LE	"	766,770	770	88	278
WT4Q/2	"	738,710	700	103	324
K2NV	"	529,980	599	91	272
K2EP	"	520,800	541	85	265
KQ2O	"	441,784	502	71	251
K2ZT	"	325,312	411	78	221
W2GO	"	259,777	408	63	196
KG2FH	"	153,816	350	53	168
KB2EOQ	"	101,907	219	60	141
NA2NA	"	72,450	205	32	106
N2UM	"	66,528	160	59	117
N2BIM	"	64,010	150	53	120
NA2X	28	56,952	175	28	98
K3WW	**A**	**5,885,100**	**2743**	**171**	**609**
AA3B	**"**	**3,772,680**	**2114**	**137**	**496**
KQ3F	**"**	**3,408,330**	**1996**	**138**	**477**
K3PP	"	2,988,600	1593	149	531
W3FV	"	2,707,180	1577	144	490
N3DL	"	2,510,344	1439	147	521
W3GM	"	2,018,128	1244	132	460
					(Op: K3ND)
NN3Q	"	2,009,536	1340	126	418
K3JG	"	1,989,150	1447	120	414
K3SA	"	1,922,544	1143	143	481
N3HF	"	1,828,288	1242	131	452
N3ZA	"	1,744,820	1068	139	466
N3AM	"	1,710,144	1108	134	442
KV3R	"	1,705,374	1264	114	372
W3MF	"	1,695,193	1128	124	439
KB3TS	"	1,531,548	1091	119	403
K3NZ	"	1,245,614	783	133	454
N3NA	"	1,131,316	797	124	400
W3CC	"	1,100,810	803	119	411
WT3P	"	1,042,468	892	95	339
NY3C	"	997,362	928	97	305
W3GK	"	966,301	883	103	324
WB3CIW	"	951,453	1031	87	306
W3OV	"	875,924	804	109	327
W3OU	"	871,948	770	108	310
K3IXD	"	623,160	665	83	277
N3II	"	612,560	556	93	310
KD3TB	"	587,840	747	76	244
K3CP	"	495,225	534	76	279
N3QQ	"	480,537	585	78	243
W3HVQ	"	462,078	484	104	294
KB3MM	"	455,880	521	78	270
W8FJ/3	"	413,624	473	87	260
W3IZ	"	368,256	435	88	248
W3UL	"	357,240	436	80	232
WA3KPP	"	164,946	309	58	164
K3GEG	"	112,112	208	55	153
N3UE	"	43,989	136	39	90
N3KF	"	43,500	115	36	109
N3RR	**28**	**790,080**	**1465**	**37**	**155**
W4NF	**A**	**2,804,262**	**1781**	**131**	**442**
W4WA	**"**	**2,179,530**	**1468**	**130**	**419**
K3KO/4	"	1,129,920	987	113	327
K9GX/4	"	884,450	970	101	249
W4WTB	"	874,676	824	98	288
W3GQ/4	"	517,482	573	82	251
N4VV	"	377,970	536	68	190
N1GC/4	"	230,472	377	82	182
K2SD/4	"	150,912	306	48	144
W4UFO	"	139,567	290	76	157
W4HJ	"	129,506	236	69	152
W4PA	"	124,032	244	57	147
N4GN	"	121,758	203	73	150
NT4P	"	16,587	72	34	63
K8YC/4	"	15,617	87	37	60
KO4MR	**28**	**95,023**	**202**	**34**	**133**
KD4RH	**7**	**46,460**	**182**	**26**	**75**
K5NA	**A**	**2,156,112**	**1101**	**177**	**567**
NA4M/5	**"**	**1,348,480**	**1117**	**127**	**363**
N5ER	"	823,935	773	106	293
K5GH	"	415,794	432	88	305
N5TW	"	358,047	477	77	190
WM5R	"	311,520	387	83	247
W5BBR	"	38,727	135	32	85
N3BB/5	"	34,496	142	32	66
N5XJ	**28**	**457,380**	**1085**	**36**	**129**
WQ5W	"	289,140	742	34	124
K5IUA	"	177,833	399	34	129
NX5M	**21**	**492,170**	**1197**	**39**	**139**
N5ZC	"	177,536	484	33	113
W6TK	**A**	**1,655,052**	**1367**	**127**	**349**
WA5VGI/6	**"**	**785,802**	**841**	**115**	**251**
W6UE	"	484,561	574	114	227
					(Op: W4EF)
K6III	"	453,600	519	103	233
N6DW	"	424,115	550	95	218
K6ACZ	"	149,513	285	66	151
N6ER	"	145,260	333	62	118
K6LA	"	132,060	373	34	108
N6SBW	"	76,653	259	59	108
K6BIR	"	43,316	167	42	56
N6IP	"	27,440	138	31	39
					(Op: K6XX)
KA6BIM	**28**	**544,098**	**1202**	**38**	**136**
W7OM	**A**	**980,694**	**975**	**118**	**311**
K7ABV	"	574,355	629	99	268
W7CT	**28**	**150,150**	**364**	**34**	**120**
N8TR	**A**	**2,760,681**	**1452**	**158**	**545**
ND5S/8	**"**	**1,243,878**	**850**	**129**	**418**
W3YX/8	"	676,575	553	125	340
N4ZR/8	"	226,176	347	63	185
N8YU	"	8,050	96	22	48
					(Op: KB8YVG)
KT8X	**28**	**306,676**	**645**	**36**	**136**
WO9Z	**A**	**1,181,952**	**943**	**120**	**366**
KB9BUM	**"**	**793,206**	**747**	**95**	**302**
W9ZP	"	585,156	605	80	283
K9PG	"	408,508	533	78	214
WD9GMK	"	162,916	295	67	174
AE9YL	"	135,095	253	60	145
W9RN	"	127,880	257	60	124
K9TTT	"	79,918	201	52	120
W9XT	**28**	**480,909**	**970**	**37**	**140**
N9XX	"	21,243	105	18	55
NRØX	**A**	**1,898,920**	**1218**	**134**	**446**
N5IN/Ø	**"**	**900,240**	**791**	**105**	**335**
NØAT	"	582,000	467	117	368
KØOB	"	527,685	526	95	286
KGØUS	"	396,660	457	88	242
KØIL	"	208,250	346	74	176
KØGT	"	203,918	297	79	174
WØTT	"	166,413	301	76	175
KØBX	"	158,878	275	64	162
WAØSXV	"	158,688	256	76	185
KBØVVT	"	96,940	199	59	126
NØHR	"	31,476	112	41	81
KØAD	"	22,848	99	28	68
WB8ZRL/Ø	"	17,836	68	35	63
KNØL	"	8,643	56	23	44
WØGOM	"	7,611	66	20	23

CANADA

VA6NO	**A**	**521,765**	**1010**	**77**	**164**
VE9FX	**"**	**509,440**	**634**	**70**	**250**
VE3ZZ	"	482,800	662	72	212
VE1RX	**28**	**192,804**	**643**	**29**	**107**

ST. MAARTEN

PJ7 /K7ZUM	**A**	**3,634,736**	**4402**	**98**	**270**

U.S. VIRGIN ISL.

NP2L	A	43,354	190	33	73

ASIA

ASIATIC RUSSIA

UAØANW	**A**	**296,153**	**554**	**72**	**175**
UAØAGI	"	143,100	243	78	187

CHINA

BA4DW	**A**	**1,662,520**	**1606**	**116**	**329**

JAPAN

JJ3ZZE	**A**	**3,498,147**	**2612**	**143**	**370**
JA1YNE	**"**	**2,262,615**	**1843**	**135**	**332**
					(Op: JP1OGL)
JR1AIB	"	1,882,000	1655	135	365
JQ1BVI	"	1,569,344	1589	143	309
7L4IOU	"	926,280	991	121	239
JA8JCR	**"**	**438,900**	**621**	**89**	**186**
JAØFVU	"	186,446	394	72	130

JA5IP	*	160,985	292	83	128
JR8OGB	**28**	**322,028**	**956**	**35**	**89**
JF2VAX	*	66,356	237	32	74
JHØALB	*	44,845	230	27	53
JA9XBW	*	39,963	186	28	49
JL3VUL	**21**	**336,199**	**838**	**37**	**119**
JQ1NGT	**"**	**172,400**	**529**	**35**	**98**
JO2AXB	*	5,720	55	21	34

LEBANON

OD5 /OK1MU	**21**	**1,397,844**	**2817**	**40**	**149**

THAILAND

HSØ/SM3DYU	A	744	14	10	14

UNITED ARAB EMIRATES

A61AJ	**A**	**10,995,416**	**5617**	**155**	**557**
		(Op: DL2CC)			

EUROPE

AUSTRIA

OE8CIQ	**A**	**557,980**	**884**	**97**	**315**

BALEARIC ISLANDS

EA6TC	**A**	**898,380**	**1984**	**80**	**242**

BELARUS

EU5A	**A**	**2,714,154**	**2648**	**142**	**492**
		(Op: EU1FC)			
EW2AA	**28**	**80,850**	**268**	**31**	**123**
EW1WZ	**14**	**570,591**	**1793**	**39**	**150**

BELGIUM

OTØT	**A**	**6,654,636**	**3839**	**164**	**664**
		(Op: ON4MA)			

CROATIA

9A6ACY	**A**	**330,962**	**903**	**52**	**202**
9A3MR	**"**	**291,796**	**622**	**72**	**189**
9A4KA	*	195,888	374	78	230
9A3ZO	*	14,450	120	23	62
9A4RV	**14**	**66,744**	**445**	**23**	**85**
9A2U	**3.7**	**32,339**	**470**	**13**	**60**

CZECH REPUBLIC

OK2FD	**A**	**3,614,423**	**2492**	**156**	**577**
OK1DUO	*	1,003,352	1473	98	339
OK1PG	*	280,170	499	81	249
OK1AXB	*	115,000	269	72	158

DODECANESE

SV5AZP	**21**	**511,024**	**2311**	**35**	**129**

ENGLAND

G3MXJ	**A**	**622,485**	**623**	**102**	**333**
GØNWY	**28**	**128,877**	**435**	**28**	**105**
G8A	3.7	17,820	270	10	56
		(Op: GØKXL)			

EUROPEAN RUSSIA

RW3QC	**A**	**3,988,422**	**3010**	**163**	**611**
RX3APM	**"**	**2,778,350**	**2496**	**140**	**474**
RM3C	*	2,338,413	2522	125	448
		(Op: RA3CW)			
RZ1AK	*	767,232	1169	93	339
UA1QV	*	710,220	1239	100	320
UA3AP	*	305,466	630	73	221
RU6LC	*	254,820	505	85	225
RA3AJ	**28**	**670,596**	**1940**	**38**	**150**
RA3AQ	*	233,280	732	37	143
RK6CZ	*	17,199	201	17	46
RU6LA	**21**	**522,831**	**1648**	**39**	**144**
UA3DPX	*	442,377	1362	39	132
RL3A	**7**	**348,348**	**1590**	**35**	**119**
		(Op: UA3ASZ)			
RA6CM	*	146,118	678	35	107
RM6A	**3.7**	**51,360**	**364**	**21**	**75**
		(Op: RA6CO)			
UA6LV	*	48,510	357	22	77

FINLAND

OH6RX	**A**	**4,391,442**	**3348**	**129**	**465**
OH6LNI	*	966,563	1113	107	392
OH6XX	*	866,450	1273	95	308
OH6NJ	28	36,270	129	27	90
OH5BM	**21**	**1,050,283**	**2835**	**38**	**135**
OH6AC	*	753,660	1921	39	141
		(Op: OH6CS)			
OH3BU	**14**	**376,808**	**1391**	**38**	**110**

FRANCE

F6KRC	**A**	**4,463,970**	**3066**	**134**	**475**

GERMANY

DJ2YA	**A**	**3,627,750**	**2227**	**146**	**545**
DL5RBK	**"**	**2,009,502**	**1632**	**128**	**433**
DJ5BV	*	1,930,180	1641	130	465
DK1RP	*	1,852,656	1509	138	486
DF6QV	*	1,550,360	1604	104	386
DL7CX	*	1,413,496	1851	130	472
DL4FAY	*	1,242,360	1266	112	392
DL6RDR	*	1,104,012	1241	110	358
DF6QN	*	1,019,360	1107	105	355
DL4NN	*	819,210	924	114	384
DJ1TU	*	729,172	1004	91	330
DK9IP	*	652,288	702	107	341
DF9ZP	*	628,992	893	95	289
DK4QT	*	496,824	674	89	292
DL9NCR	*	435,916	614	101	303
DL8AAM	*	431,424	835	67	254
DK9TN	*	190,208	503	59	197
DF2IAX	*	187,985	436	64	223
DL9NDV	*	164,592	291	74	180
DJ5IW	*	151,960	383	61	201
DL6NCY	*	44,588	150	45	97
DLØFR	*	39,864	161	45	106
			(Op: DJ5IW)		
DL8UD	*	19,434	123	26	53
DK5WL	*	14,043	84	31	62
DJ8QP	*	9,912	132	16	68
DLØTU	*	8,820	112	15	69
DJ3XM	*	8,610	65	21	49
DL3NM	*	6,110	44	27	38
DK2FR	*	4,095	39	18	21
DN1MQP	*	1,968	43	12	36
DK3DM	**28**	**887,195**	**2064**	**39**	**152**
DH6LS	**"**	**619,272**	**1343**	**40**	**148**
DL5IC	*	174,899	473	39	124
DJ6TK	*	50,032	202	29	77
DL1LH	**3.7**	**39,566**	**539**	**13**	**60**

GREECE

SV3AQR	**A**	**84,535**	**366**	**41**	**104**

HUNGARY

HA7SK	**A**	**72,930**	**305**	**43**	**127**

IRELAND

EI8IR	**A**	**2,977,871**	**3005**	**123**	**410**

ITALY

IZ5CML	**A**	**993,811**	**1022**	**119**	**350**
IQ2A	**"**	**958,632**	**1726**	**69**	**167**
		(Op: I2UIY)			
IK3OII	*	661,664	1011	90	278
IK3RIZ	*	442,672	520	93	286
I2SVA	*	300,720	490	68	212
IK4ZGY	*	245,622	494	75	207
IK7WUE	*	189,267	533	57	154
IR4T	**28**	**745,893**	**1781**	**38**	**141**
		(Op: IK4MHB)			
IC8POF	*	452,606	1602	35	119

LATVIA

YL8M	**A**	**4,269,843**	**3326**	**144**	**513**
		(Op: YL2KL)			

LITHUANIA

LY5W	**A**	**1,180,674**	**1390**	**124**	**410**
		(Op: LY1DR)			

MACEDONIA

Z31GX	**14**	**719,264**	**2212**	**40**	**142**

NETHERLANDS

PA3FNE	**A**	**1,247,816**	**1525**	**102**	**386**
PAØKHS	*	395,520	799	67	253

NORTHERN IRELAND

GI4LKG	**28**	**79,414**	**366**	**25**	**93**

POLAND

SN3A	**21**	**938,938**	**2486**	**39**	**143**
		(Op: SP3GEM)			
SP6OJJ	7	18,404	137	20	66

PORTUGAL

CT1FOH	**A**	**83,030**	**204**	**61**	**169**

SCOTLAND

MMØBQI	**A**	**378,169**	**660**	**81**	**260**

SLOVAK REPUBLIC

OM1A	**21**	**1,142,009**	**2711**	**40**	**147**
		(Op: OM1CW)			

SLOVENIA

S5ØR	**A**	**3,590,615**	**3140**	**134**	**459**
S52ZW	**"**	**2,680,475**	**2337**	**136**	**459**
S5ØC	**28**	**1,426,726**	**3158**	**40**	**162**
		(Op: S55OO)			
S51TA	**21**	**1,160,690**	**2725**	**39**	**146**
S53M	**14**	**677,740**	**2051**	**39**	**149**
		(Op: S53ZO)			
S59CAB	**3.7**	**125,305**	**1201**	**17**	**78**
		(Op: S53CC)			
S57M	**1.8**	**43,904**	**671**	**8**	**56**

SPAIN

EA5YJ	**A**	**845,624**	**1405**	**86**	**290**
EA1BHQ	28	50,208	254	24	72
EA1DDO	**14**	**437,703**	**1368**	**31**	**102**
EA7DHP	*	291,080	1090	35	117

SWEDEN

SK3W	**A**	**3,895,344**	**2736**	**142**	**497**
		(Op: SM3EVR)			

UKRAINE

EM3J	**A**	**4,198,230**	**3720**	**151**	**506**
		(Op: UU2JZ)			
EO1I	**28**	**563,108**	**1990**	**38**	**144**
		(Op: UT1IA)			
UT5UGR	**21**	**613,228**	**2503**	**38**	**143**

YUGOSLAVIA

YT7R	**A**	**5,237,680**	**3747**	**158**	**594**
YZ1AU	**28**	**713,880**	**1762**	**38**	**142**
4N1N	*	179,322	825	34	109
		(Op: 4N1LB)			
YU1JW	**14**	**607,240**	**2092**	**38**	**132**

OCEANIA

AUSTRALIA

VK6WR	**A**	**83,385**	**204**	**47**	**106**

BELAU

T88TU	**A**	**696,087**	**1268**	**80**	**123**
		(Op: JK7TKE)			

INDONESIA

YBØAVK	**A**	**899,725**	**906**	**105**	**260**
		(Op: HA7VK)			

PHILIPPINES

4F3XX	**A**	**380,632**	**832**	**79**	**117**

SOUTH AMERICA

ARGENTINA

LU5VV	**28**	**1,306,030**	**3054**	**35**	**120**

BRAZIL

PY2RCI	28	6,762	143	13	36
PY5BF	7	14,400	83	19	56

CHILE

CE4PBB	21	18,490	163	14	29

ECUADOR

HD2M	**A**	**1,384,560**	**2774**	**73**	**167**
		(Op: KG4CIJ)			

MULTI-OPERATOR SINGLE TRANSMITTER NORTH AMERICA

UNITED STATES

K1AR	**9,799,092**	**4172**	**185**	**694**
K1ZR	**3,355,214**	**2961**	**158**	**560**
N1MM	**2,952,400**	**1854**	**136**	**469**
W1HR	2,542,419	1704	125	424
KK1L	2,305,632	1712	126	385
N1RR	1,474,860	1131	122	401
W1SRG	632,341	665	84	283
K1YR	576,090	671	72	261
N1ND	509,178	577	78	261
K1GW	391,155	504	67	226
N1SOH	301,678	450	70	213
KA1VMG	191,352	343	63	175
W2A	**8,889,616**	**4063**	**171**	**637**
N2NU	**8,058,888**	**3984**	**171**	**603**
K2UA	**5,924,800**	**3032**	**165**	**571**
W6XR/2	4,651,171	2475	160	561
N2MM	3,762,500	2062	150	550
K2XR	2,757,429	1695	147	510
W2LC	1,563,822	1240	120	369
N2SS	1,519,788	1102	113	379
N2LBR	1,189,914	959	107	340
W2UP	1,180,820	1008	104	356
AE2F	1,148,728	865	121	390
AB2DE	976,668	966	104	349
K2YEH	887,247	769	114	345
N1XL/2	683,846	795	76	255
WB2KHO	682,752	668	94	290
KA2JEM	308,898	534	68	194
NE3F	**3,128,080**	**1968**	**142**	**499**
NZ3O	**2,195,088**	**1420**	**128**	**436**
W3GNQ	**2,128,212**	**1587**	**133**	**425**
K3OO	1,433,160	1028	132	408
WY3T	456,630	585	79	231
K3BSA	433,316	547	82	256
WM3T	162,000	316	61	139
K4JA	**7,351,132**	**3413**	**178**	**624**
W4MR	**6,007,908**	**2959**	**173**	**585**
K1PT/4	3,978,936	2300	156	520
W4WS	3,572,655	2216	142	503
N8PR/4	2,963,304	2193	147	465
W4CAT	2,061,616	1507	127	411
WS4Y	1,154,595	1015	121	344
W4ZR	1,154,104	911	129	389
K4NO	1,114,924	1031	116	306
NT4TT	958,364	870	117	389
W4SVI	140,833	229	49	104
K5MR	**9,046,637**	**4097**	**182**	**659**
N5YA	**3,906,969**	**2571**	**159**	**528**
N1LN/5	2,894,850	2085	147	483
AA5NT	2,456,180	1589	149	486
W6EEN	**4,885,760**	**2895**	**162**	**532**
K6ZM	**2,408,826**	**1932**	**135**	**363**
K6AA	1,033,236	880	133	353
AF6P	102,989	301	68	113
W6YRA	52,416	234	63	93
AD6ID	11,700	80	31	47
NK7U	**4,629,730**	**2810**	**173**	**492**
W7VJ	**1,495,440**	**1473**	**119**	**283**
W7/KL7CQ	348,768	541	87	201
W7NG	202,444	376	64	150
NØAX/7	60,853	185	51	100
W7FIQ	57,348	202	62	100
KD7HGV	1,375	24	12	13
K8AZ	**6,488,910**	**3090**	**178**	**632**
N8NR	**4,503,474**	**2348**	**162**	**549**
K8DAC	851,580	984	95	285
KX9X	**3,609,620**	**2488**	**154**	**490**
WN9O	**2,862,048**	**1658**	**154**	**518**
KD9ST	1,973,615	1264	147	448
K9QT	1,164,445	945	119	344
K9CU	571,416	959	92	256
W9REG	334,236	456	90	232
NØNI	**4,532,294**	**2418**	**175**	**579**
KØAB	**2,615,450**	**1846**	**150**	**428**
KØIR	2,377,470	1666	146	436
AE9B/Ø	1,443,624	1157	138	408
ABØMV	1,297,161	1216	123	326
NØIJ	476,256	523	102	261
NØUU	375,480	625	63	189
KØGEO	212,741	365	65	164

BAHAMAS

C6AGS	**2,525,889**	**3601**	**86**	**253**

BELIZE

V31GC	**3,983,051**	**5247**	**104**	**263**

CANADA

VO2CQ	**8,242,200**	**4874**	**143**	**541**
VY2SS	**8,075,172**	**4539**	**163**	**590**
VC5C	**6,233,874**	**4845**	**141**	**456**
VE6SV	**4,839,022**	**3591**	**151**	**462**
VA3MG	**4,596,510**	**3399**	**143**	**463**
VA3SK	4,232,802	2700	146	505
VE3RM	3,757,000	3089	121	399
VE2CSI	2,950,528	2973	105	343
VE6AO	1,211,091	1785	86	217
VE3MIS	1,166,250	1391	94	281
VE3DC	938,220	1031	99	281
VE3KPP	470,824	815	70	187
VE2CMH	196,992	400	47	169
VA3DJL	73,632	297	56	100

GUADELOUPE

FG5BG	**7,741,188**	**6378**	**136**	**410**

MARTINIQUE

FM5BH	**11,604,873**	**6931**	**152**	**571**

NICARAGUA

YN2EJG	**2,468,048**	**2799**	**110**	**297**

PUERTO RICO

KP4AM	**762,968**	**1589**	**72**	**211**

TURKS & CAICOS ISLANDS

VP5L	**14,009,904**	**8651**	**150**	**558**
VP5DX	**12,595,385**	**7806**	**157**	**552**

AFRICA

CANARY ISL.

EA8KK	**5,213,390**	**4771**	**103**	**339**
ED8WWC	**5,011,086**	**4218**	**110**	**343**

MADEIRA ISL.

CQ9K	**9,647,644**	**5876**	**149**	**503**
CQ9T	**6,171,452**	**4781**	**110**	**408**

REUNION

FR/N7DD	**4,548,192**	**3644**	**127**	**345**

ASIA

ASIATIC RUSSIA

RF9C	**8,632,575**	**4198**	**163**	**620**
RW9OWD	**2,042,620**	**2066**	**114**	**356**
RW9C	1,760,616	1488	117	339
RK9SWF	1,700,192	1564	97	319
RW9UWK	759,370	977	100	260
RK9JWJ	279,156	515	64	194
RK9CWA	23,166	118	23	55
RZØIWR	17,927	229	22	22

ASIATIC TURKEY

YM3WW	**1,395,054**	**1921**	**61**	**221**

CAMBODIA

XU7AAP	**786,064**	**1242**	**85**	**207**

CHINA

B4R	**1,929,180**	**2606**	**114**	**281**
B7K	**1,150,239**	**2482**	**114**	**267**

CYPRUS

P3A	**17,409,816**	**8282**	**167**	**635**

GEORGIA

4LØG	**4,377,727**	**3593**	**116**	**383**

JAPAN

JH7PKU	**7,352,656**	**3917**	**166**	**522**
JE4VVM	**6,909,786**	**3938**	**158**	**505**
JA7YAA	**4,780,332**	**2753**	**158**	**484**
JI2ZJS	**3,776,184**	**2720**	**146**	**391**
JK6SEW	**3,234,888**	**2458**	**140**	**397**
JH7AFR	2,713,158	2473	127	300
JJ3YBB	**2,334,905**	**2893**	**101**	**264**
JI2KVW	2,006,499	1850	125	326
JI2ZEY	1,951,756	1942	126	295
JA2ZJW	1,716,276	1771	115	241
JHØZHQ	1,103,887	1268	110	239
JA1YKX	515,577	791	86	181
JJ1ZXE	391,020	605	93	173
JA6ZLI	20,412	102	33	51

KAZAKHSTAN

UPØL	**9,014,822**	**5017**	**155**	**564**
UN4L	117,786	270	53	148

KOREA

HLØO	**611,620**	**1051**	**89**	**176**

KYRGYZSTAN

EX9A	**6,237,986**	**4538**	**143**	**456**

SINGAPORE

9V1YC	**2,009,390**	**2392**	**119**	**311**

TAIWAN

BV2B	**295,483**	**1245**	**73**	**120**

EUROPE

AUSTRIA

OE2S	**8,815,280**	**5302**	**164**	**644**
OE5T	**4,778,160**	**3769**	**139**	**549**
OE1A	3,594,226	3231	146	548
OE2XPA	714,400	1256	85	315

BELGIUM

OTØL	**6,630,563**	**4063**	**158**	**599**
OTØC	**5,903,040**	**4238**	**151**	**553**
OTØP	4,683,536	3827	129	469
OR5EU	959,692	1514	81	235
ON6BR	564,828	1056	81	282

BOSNIA-HERZEGOVINA

T9ØE	**296,100**	**948**	**64**	**218**

BULGARIA

LZ5Z	**7,263,108**	**5017**	**172**	**611**

CROATIA

9A7A	**10,153,116**	**6001**	**170**	**664**
9A2L	2,933,481	2690	133	468
9A1CMS	433,593	775	78	225

CZECH REPUBLIC

OK5W	**9,023,670**	**5173**	**178**	**677**
OL5Q	**5,294,370**	**3762**	**152**	**538**
OL7R	2,113,848	2425	124	437
OK1KDO	213,993	483	71	208
OK2KQM	40,432	248	41	111

DENMARK

OZ9KY	**2,313,500**	**2510**	**115**	**385**
OZ5ESB	**1,858,903**	**2213**	**97**	**334**
OZ/DL7VYL	1,240,843	1862	109	334

ENGLAND

M1P	**6,338,164**	**3923**	**153**	**589**
G6YB	**4,664,604**	**4377**	**130**	**458**
GB3RS	2,721,864	2901	112	452
G9Q	2,305,086	3068	96	330
G3B	1,380,740	1520	113	414
M2G	1,362,060	1916	80	235
M4U	708,000	1307	66	229
GØWIH	101,722	358	42	139

ESTONIA

ES1XQ	219,175	605	62	213

EUROPEAN RUSSIA

RU1A	**11,679,388**	**5787**	**186**	**712**
RK3DWH	**5,290,632**	**3758**	**166**	**580**
RI3A	**2,551,207**	**3375**	**116**	**411**
UF3CWR	2,507,204	2854	132	461
RX3RXX	2,175,943	2731	129	410
RK4WWA	2,005,884	2538	139	465
RZ1AWO	1,837,647	2115	123	444
RZ3DZF	1,401,250	1959	109	366
RK3QWM	1,254,505	1558	120	391
RK6LZS	852,623	1120	100	277
RW3WWW	597,324	1365	80	284
RK3DZD	223,680	784	60	180
RK3VWC	7,461	200	32	94

FINLAND

OH7M	**2,080,980**	**2387**	**121**	**374**
OH1X	**1,788,005**	**1857**	**115**	**426**

FRANCE

F6BEE	**9,174,910**	**4898**	**168**	**649**
F9FE	**5,560,800**	**3954**	**144**	**518**
F6KDF	4,658,082	4109	138	533
F5KBA	2,920,890	3358	110	380
F8KCF	1,780,584	1795	111	396
F6KFV	1,071,334	1315	103	363
F5KQN	964,228	1235	96	290
F6KFI	254,464	560	73	211

GERMANY

DF3CB	**5,407,292**	**3287**	**154**	**594**
DL2ARD	**5,065,811**	**3736**	**152**	**531**
DKØDL	2,941,970	2200	137	533
DLØGK	2,608,032	2029	142	530
DL1RYD	1,344,120	1456	121	431

DJ1YH	1,265,628	1270	112	420
DHØDX	880,740	2125	40	149
DLØDX	801,975	1006	101	324
DN1TUX	789,939	1203	99	360
DLØML	649,638	936	81	293
DFØCG	618,995	769	100	345
DLØPAF	497,250	802	94	281
DN1MA	59,926	206	48	118

GIBRALTAR

ZB2X	11,199,232	7595	150	554

HUNGARY

HG1R	1,253,690	2441	104	339

ICELAND

TF3IRA	1,718,476	2967	84	265

IRELAND

EI9E	2,502,797	2667	107	410

ISLE OF MAN

GD6IA	5,336,425	4721	123	442

ITALY

IQ4A	13,581,494	6290	177	709
IR3Z	4,573,884	3526	157	557
IQ2X	3,965,148	2969	151	531
I4GAS	1,849,232	1979	103	315
II4M	1,547,120	1787	98	368
IR3P	1,197,960	1379	119	417
I3EJ	1,171,800	1634	89	289
II3A	980,055	1168	105	330
I4MFA	668,276	962	91	315
IZ6CST	551,208	830	89	268
IO2L	515,673	823	79	190
IZØBEE	312,042	573	90	303

JERSEY

GJ1Y	2,252,384	2606	103	369

LATVIA

YL7C	2,433,675	2756	120	435

LITHUANIA

LY4ØZZ	5,175,885	3799	163	578
LY2IN	1,336,959	1655	110	397

LUXEMBOURG

LX9SW	5,801,889	4086	151	588

NETHERLANDS

PA7MM	7,492,721	4664	152	587
PI4CC	4,539,727	3471	146	563
PI4ZWN	267,900	622	67	215

NORTHERN IRELAND

GNØXYZ	260,768	779	49	183

NORWAY

LA7G	2,643,354	2681	131	436
LA2Z	1,794,486	2163	102	380
LA3T	10,125	110	29	52

POLAND

SN8V	3,887,115	3538	136	457
SP5ZCC	1,626,984	1742	110	421
SP9KDA	661,362	1103	93	324
SP9KRT	394,745	733	85	273
SP9KDU	248,810	572	62	216
SP3PFR	213,528	576	70	217
SP9KJT	188,496	639	55	183
SP9KJU	106,128	281	62	136
SP3KPN	46,464	209	42	109

ROMANIA

YP3A	3,555,134	4065	127	456

SICILY

IT9ECQ	2,017,554	2508	101	361
IQ9K	1,650,916	2569	89	300

SLOVAK REPUBLIC

OM7M	8,280,915	4865	173	658
OM3A	7,332,251	4497	165	646
OM5M	6,763,278	4431	152	627

SLOVENIA

S5ØQ	8,129,825	4494	160	639
S53S	2,627,898	2556	116	430
S51SL	2,190,300	2485	133	455
S51O	875,673	1212	98	349

SPAIN

EA1EEY	5,202,680	3868	129	466
ED3TR	3,520,598	3420	127	451
EA1COZ	2,409,771	2382	109	398
ED1BD	1,657,344	2152	99	317
EA4ST	1,637,835	2268	101	310
EA3RKG	1,492,480	1956	97	327
ED4TE	1,297,056	1610	88	266
ED2WW	1,247,418	1781	80	253
ED1IDT	739,840	1198	71	249
EA1URO	484,194	882	69	234
EA1AXH	371,408	800	74	260
EA7UR	366,024	836	70	232
EA1FCR	284,328	698	59	205
EA5ANQ	115,444	372	69	197
ED4TD	83,072	337	43	133

SWEDEN

8S2F	2,848,176	3134	127	386

SWITZERLAND

HB2H	3,930,948	3469	139	545
HB2OK	872,034	1727	70	233

UKRAINE

UU7J	6,383,328	5226	172	612
UT7L	3,323,250	2968	140	493
UTØAZA	1,601,225	2333	98	377
US8U	1,328,121	1794	110	409
UX8IXX	979,284	2216	99	375
UR4MWU	176,970	524	53	189

WALES

GWØS	255,300	581	56	166

YUGOSLAVIA

YU1INO	114,444	372	56	148
YU7AJM	72,240	307	36	132

OCEANIA

AUSTRALIA

VK4WIL	2,278,500	2985	93	201

EAST MALAYSIA

9M6AAC	3,900,060	3165	141	320

FED. STATES OF MICRONESIA

V6T1	1,547,361	2389	97	148

GUAM

AH2R	10,260,544	5998	154	465

HAWAII

KH7V	1,177,344	1999	80	139

MARSHALL ISL.

V73AX	6,081,370	4939	144	301

NEW ZEALAND

ZL3DXC	2,484,937	2778	100	229

PHILIPPINES

DX1S	2,578,344	2323	132	292

SOUTH AMERICA

ARGENTINA

LT1F	7,880,564	5991	132	391
LS7N	6,518,148	4593	135	411
LT5H	1,340,757	1755	92	227
LU4DRC	426,400	972	66	139

BRAZIL

ZW5B	17,014,752	8070	176	662
PY2GEC	920,112	1592	67	165
PY2BM	619,136	1181	60	164
PY2LDS	28,880	131	38	57
PY5CAM	4,653	84	21	26
PY3PXY	2,145	34	14	19

CHILE

CE4TA	3,293,370	3407	111	276
CE3AA	2,988,836	3152	97	252
CE6TC	1,088,272	1559	96	176

FRENCH GUIANA

FY5KE	10,091,010	6615	132	423

PERU

OA4O	3,080,625	3057	104	271

MULTI-OPERATOR MULTI-TRANSMITTER NORTH AMERICA

UNITED STATES

KC1XX	20,691,530	8575	196	769
K3LR	20,008,190	8260	192	778
W3LPL	18,194,336	7652	198	760
K9NS	14,482,776	6318	194	730
N3RS	11,891,996	5379	180	679
W4MYA	11,041,326	5329	179	655
N4TO	10,853,379	5150	179	658
N2RM	10,781,519	4956	178	655
K1KI	10,505,176	5008	177	647
K1TTT	10,275,200	5276	176	669
NO4I	10,225,320	5114	177	663
W1FJ	10,174,725	4738	174	651
W6KK	9,598,531	5049	177	574
KR1G	9,509,661	4616	171	642
W3PP	9,030,528	4548	173	631
W2AX	7,829,717	3989	168	605
KB1H	7,345,450	3858	162	613
K3NM	6,576,442	3609	155	572
K2RD	6,272,504	3282	158	549
K3II	5,691,574	2929	154	567
KV1W	5,191,256	2774	156	541
K3ANS	4,816,941	2582	170	583
W8ZA	3,780,231	2119	157	524
W2CG	3,539,393	1965	151	538
WW4M	3,326,751	2015	139	474
W6YX	2,995,776	1985	143	433
N1MD	2,840,508	1938	133	461
WØAIH/9	2,749,752	1785	146	487
K1IR	2,485,300	1577	129	451
K6IDX	1,094,625	804	132	393
K3DI	1,070,650	876	112	363
K4WPM	571,835	824	104	303
AA2D	160,300	284	67	162
KM5TY	84,846	245	48	110
W8YY	23,058	119	43	83
N4CU	9,271	67	30	43

ALASKA

KL7Y	15,244,460	9580	161	504
KL7RA	11,673,360	8015	152	468

ANGUILLA

VP2EK	6,149,508	7219	103	328

ANTIGUA

V26B	33,938,394	16448	183	704

CANADA

VE3EJ	26,396,325	12069	189	738
VB2R	7,969,104	6764	134	438
VE5RI	5,198,177	5112	124	343
VE6FI	3,491,992	3307	135	373
VE3SY	2,977,896	2795	124	384
VE7SCC	643,841	1152	97	216
VE2CQ	33,221	233	49	90

GRENADA

J3A	24,983,360	13548	168	640

ST. PIERRE & MIQUELON

FP/N8KR	5,536,539	5072	105	372

ST. VINCENT

J8ØWW	11,484,655	8139	139	448

TURKS & CAICOS ISL.

VP5T	13,399,161	9782	137	452

AFRICA

AFRICAN ITALY

IG9A	50,742,692	17852	205	807
IH9P	41,762,574	16286	178	740

ERITREA

E3ØTA	13,021,632	8072	134	430

MOROCCO

CN8WW	78,170,508	25711	199	854

ASIA

ASIATIC RUSSIA

RKØAXX	12,288,176	7916	176	588

CHINA

BY1DX	1,926,415	2316	117	278

JAPAN

JA3YBK	14,267,988	7273	170	559
JA5BJC	11,163,356	5925	174	550
JA7YRR	6,459,478	4727	151	435
JA1YPA	6,196,279	3997	164	465
JA1ZLO	1,772,292	1691	131	321
JA2YKA	334,332	632	72	150

TAJIKISTAN

EY2A	7,138,208	4959	142	474

THAILAND

HSØAC	4,046,120	4210	136	366

EUROPE

BELARUS

EU5F	6,441,544	6199	148	558

BELGIUM

OTØA	19,281,152	11906	180	722

CZECH REPUBLIC

OL5T	1,540,413	2114	104	395

DENMARK

OZ5W	6,655,488	5167	148	524
OZ5WQ	2,863,931	3015	132	491

ENGLAND

M6T	23,968,284	13638	185	763

ESTONIA

ES9C	13,092,595	9183	179	660

EUROPEAN RUSSIA

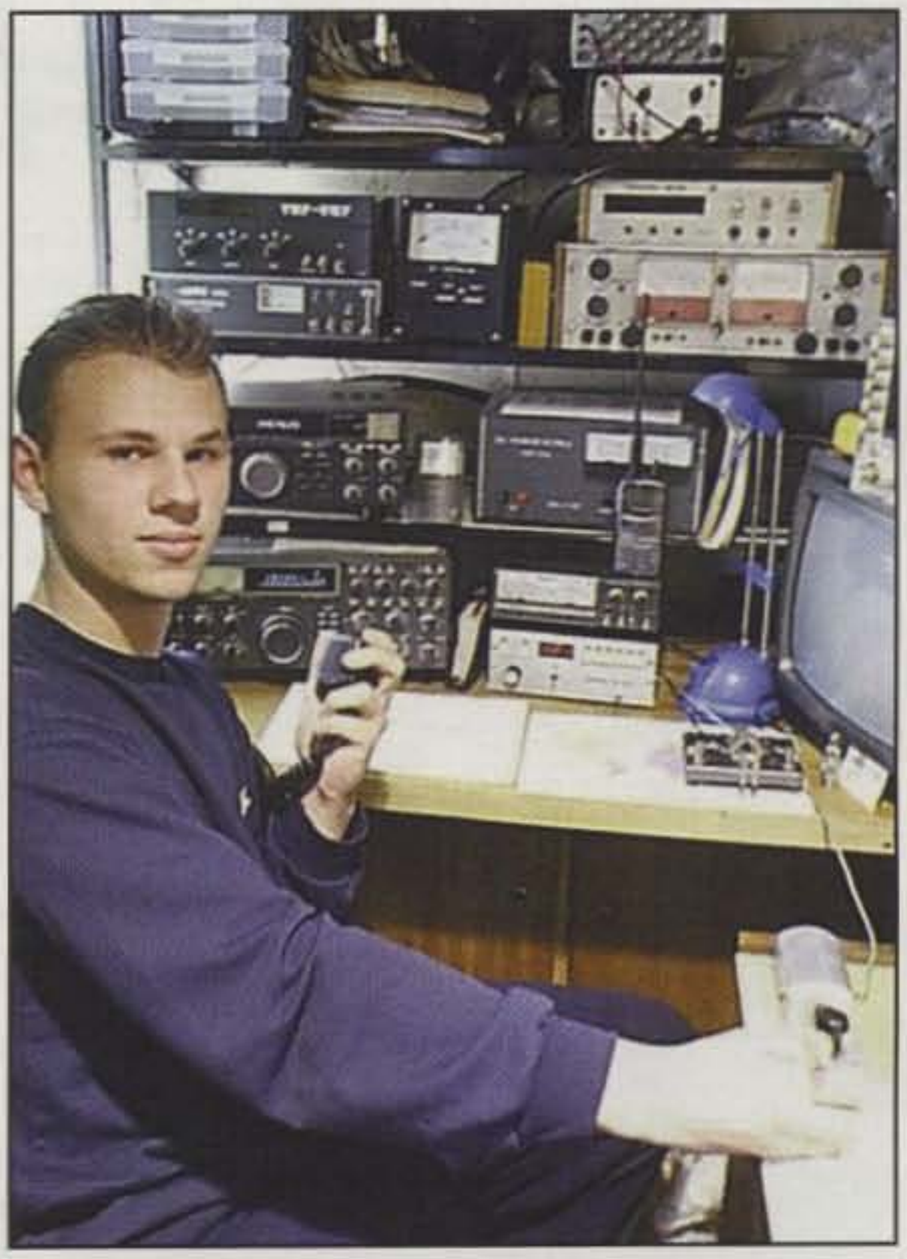
RZ3AZO	3,225,516	3505	136	466
RK4LWA	39,872	367	43	135

FINLAND

OH2U	20,655,910	11098	191	755

GERMANY

DFØHQ	18,548,716	11244	178	736
DL2DBH	2,703,036	2544	121	467
DL3EBB	2,426,760	2664	112	428



Ati, HA8LIF, #3 Low Power, All Band Hungary.

HUNGARY

HG6N	17,819,120	11417	175	705
HGØHQ	11,111,484	8847	162	600

ITALY

IU2D	15,762,660	9972	171	699

KALININGRAD

RW2F	21,395,826	12565	187	731

LIECHTENSTEIN

HBØ /HB9AON	8,381,190	7342	134	540
HBØ/DK7ZL	3,515,603	3949	130	507

LITHUANIA

LY7A	11,067,186	8342	168	638

NETHERLANDS

PI4COM	4,753,524	3430	144	572

NORWAY

LA1K	965,679	1859	90	339

POLAND

3Z1KG	57,782	234	42	125

SARDINIA

ISØA	662,354	1245	85	306

SCOTLAND

GMØB	3,791,871	4566	124	455
GM2T	1,400,091	2158	87	312

SHETLAND ISL

GZ7V	10,538,220	7762	160	610

SPAIN

EA4URE	9,453,932	7373	151	592
ED7VG	2,654,652	3199	96	366
EA3ESJ	1,611,968	1695	120	446
ED1SML	596,755	1177	77	278
ED2URV	314,502	869	67	251
ED4RAX	193,362	514	56	166

SVALBARD

JW5E	3,712,646	3720	129	380

VIENNA INTL CTR

4U1VIC	7,824,090	7300	149	556

OCEANIA

NEW ZEALAND

ZL6QH	2,916,144	2654	127	269

PHILIPPINES

DX1DBT	557,947	1361	70	97

SOUTH AMERICA

BRAZIL

PY3MHZ	3,914,379	3500	118	329

VENEZUELA

YV4A	20,164,788	10936	154	560

CHECK LOGS

Our thanks to the following stations who sent in check logs:

A45XR, AA4D, AG4CG, CE5GO, DA2OOO, DFØEB, DFØSAX, DF3IAL, DH5MM, DJ3VC, DKØRQ, DLØSAD, DL1ARK, DL1EFG, DL1EJG, DL1EKS, DL1JFM, DL2AL, DL2AYL, DL2HWI, DL2RVD, DL3DXX, DL3JON, DL4JU, DL4MFP, DL5CX, DL5DWW, DL5KVV, DL5MHR, DL5ST, DL7ALM, DL7VMM, DL8JDX, DM5OH, EA1CXY, EA1KW, EA1LZ, EA2BAP, EA3ALV, EA3BJM, EA3BSE, EA3CZR, EA5CXL, EA5SM, EA7US, EA8AYV, EA8BMH, EA8BVX, EA8ZZ, EC3ABK, EC5AKF, ER3DX, ES6EA, EW8CM, F5JBR, GØVSN, G3LUW, G4EDR, G8L, HA5AF, HK3DDD, I3YYY, JJ1GWF, K1FZ, K3SWZ, K5K, K6FM, KO3Q, KRØI, KX7J, LA1FW, LA1YE, LA2QM, LA4LN, LA4OGA, LA4TG, LA7FJA, LA8CD, LA9GY, LA9LO, LA9NM, LA9TJA, LU9APM, LW9DAH, LY2BET, LZ1DM, M2H, OH5NZ, OK1TRM, OK2BHD, OK2BOV, OK2QU, OMØTT, OZ4EL, PAØRBO, PAØUKC, PAØULA, PA3HGF, PA7DA, PY2TNT, PY2YP, RA9AC, RA9XI , RK3BA, RK9AD, RN3FT, RU1AO, RW3DL, RW4WE, RZØSB, RZ6AVD, RZ6BR, S5ØK, S51DI, S57NEZ, SMØBXT, SMØCMH, SM2SCK, SM3X, SM4BNK, SM4JWI, SM5CVC, SM5ENX, SP1EGN, SP1RKB, SP2MEF, SP2QCU, SP3DRM, SP3MEP, SP4DZT, SP4GHL, SP4HXV, SP4MPA, SP5ATO, SP5CEQ, SP5ZDH, SP6CES, SP6FIB, SP6OJG, SP7ICE, SP8HKT, SP8UZJ, SP9CQ, SP9DAE, SP9HQJ, SP9MAT, SP9MAX, SP9MCU, SP9MQH, SP9PRO, SQ4GXO, SQ4NR, SQ8AMD, SV/OK1YM, TF8GX, UA3AGW, UA3XCK, UA4AO, UA4LFC, UA6AF, UA6BS, UA9CKS, UN7TO, UT9NA, UUØJC, VO1SA, W6YA, W7ZR, WT4I, YL2LY, YL3FW, YN4/SMØHLG, YO2AIX, YO3FOM, YO5OAW, YO6BZL, YO7LBX, YO8AII, YO8BGD, YO8BNG, YO8CRU, YO8GF, YO8KAN, YO9BXC, YO9DFQ, YO9GJX, YO9GVN, YO9HH, YO9IF.

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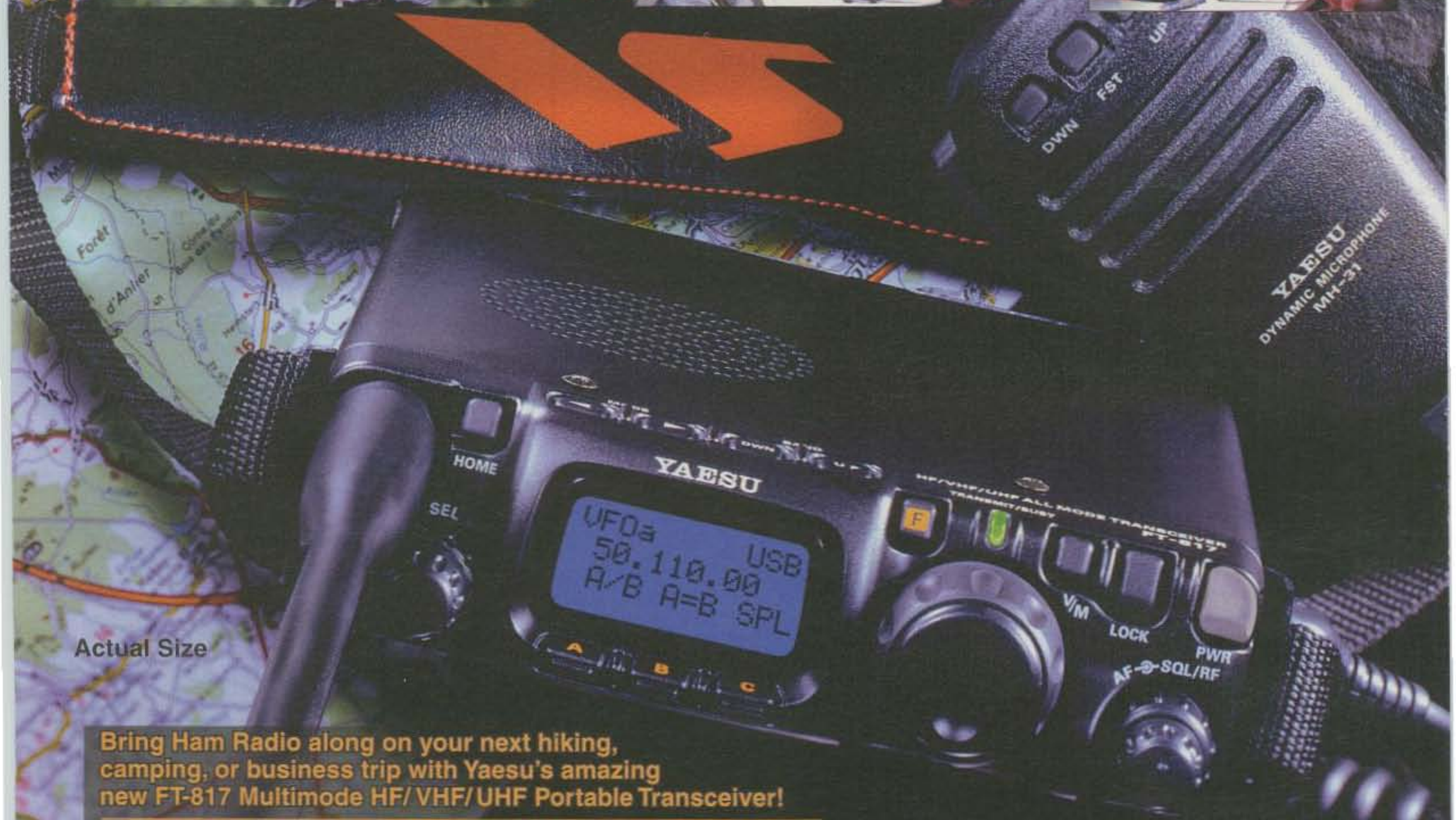

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- **MULTIMODE DESIGN:** Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.
- **5 WATTS POWER OUTPUT:** Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts; via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.
- **WIDE CHOICE OF POWER SOURCES:** The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.
- **TWO ANTENNA PORTS:** A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.
- **OPTIONAL COLLINS® MECHANICAL FILTERS:** An optional filter slot is provided, accommodating either the YF-122S (2.3 kHz) 10-pole SSB filter or the YF-122C(500 Hz) 7-pole CW filter. You get "base station" performance even from a mountain top.
- **INCREDIBLE MEMORY RESOURCES:** You get a total of 208 memories, including 200 "regular" memories which may be separated into ten groups of up to 20 channels each. And you can append an Alpha-Numeric "Tag" to each memory to aid in channel identification.
- **A CW OPERATOR'S DREAM MACHINE:** You get a built-in Electronic Keyer with adjustable weighting, adjustable CW Pitch, CW Normal/Reverse frequency tuning, and you can even use the microphone's UP and DOWN keys to send CW via the Keyer.
- **BUILT-IN CTCSS AND DCS:** The built-in CTCSS and DCS Encoder/Decoder systems provide you with the versatility you need for repeater access or selective calling.
- **DUAL - COLOR LIQUID CRYSTAL DISPLAY:** Select from Blue or Amber display illumination, which can also be switched off to conserve battery life. And while you're away, the Spectrum Scope will provide you with a visual record of activity ±5 channels from your current operating frequency.

ALL MODE PORTABLE TRANSCEIVER

FT-817

HF/50/144/430 MHz Multimode Transceiver

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Real Performance for the Real World!

Today's elite-class operators demand the best RF weaponry available. Yaesu's exciting new MARK-V FT-1000MP answers the call, with an expanded array of receiver filtering, 200 Watts of power output, and Class-A SSB operation capability for the cleanest signal on the band. Enhanced front-panel ergonomics on the front panel save you seconds in a pile-up or a contest "run," and Yaesu's HF design and manufacturing know-how ensures that no short-cuts have been taken in our effort to bring you the best HF transceiver money can buy. For more QSOs in your log, and more awards on your wall, there is only one choice: the MARK-V FT-1000MP from Yaesu!

I. Interlocked Digital Bandwidth Tracking System (IDBT)

II. Variable RF Front-End Filter (VRF)

III. 200 Watts of Transmitter Power Output

IV. Class-A SSB Operation

V. Multi-Function Shuttle Jog Tuning/ Control Ring

Features

■Frequency Coverage: (RX) 100 kHz-30 MHz; (TX)160-10 m Amateur Bands ■Dual In-band Receive w/Separate "S" Meters ■Ten Pole Collins® Mechanical Filter Built-in ■RX DSP Noise Reduction and CW Peaking Filter ■High-speed Automatic Antenna Tuner ■Two TX/RX Antenna Jacks plus RX-only Jack ■TX Microphone Equalizer ■RF Speech Processor ■Direct Digital Synthesis ■CW Spot and Two Key Jacks ■Two Headphone Jacks (1/4" and 3.5 mm) ■Low-Level Transverter RF Drive Jack ■Separate FP-29 Power Supply (30 V/13.8 V DC Output)

HF 200 W All-Mode Transceiver
MARK-V FT-1000MP

For Elite-Class Amateur Radio Operators...

A NEW BREAKTHROUGH IN TRANSMITTED AUDIO QUALITY: THE YAESU MD-200A8X HIGH-FIDELITY DESKTOP MICROPHONE.

- New-Technology Polyethylene Terephthalate Film High-Fidelity Dynamic Microphone Element
- Vibration-Resistant Housing
- VSPC (Variable Side Pressure Control) Technique (Patent Pending)
- Ease of Operation through Ergonomic Design
- Provision for User-Supplied Additional Microphone Element

VSPC (Variable Side Pressure Control)

APPLICABLE TRANSCEIVERS

MARK-V FT-1000MP, FT-1000MP, FT-1000/-1000D*, FT-990*, FT-920, FT-900, FT-847, FT-840*, FT-817

* The FT-1000/-1000D/-990/-840 do not support the illumination of the TX LED during transmission.

Ultra-High-Fidelity Desktop Microphone
MD-200A8X

Expand Your DX Horizons With The FTV-1000 50 MHz Transverter!

- 50 MHz Transverter with 200 W PEP Power Output
- Class-A Bias Selection for Low TX IMD (PO: 50 W)
- High-Performance Receiver Front End
- Automatic, Effortless Operation with MARK-V FT-1000MP
- Upgrade to High Power with VL-1000 Linear Amplifier

Specifications

Frequency Range:	50-54 MHz
Antenna Impedance:	50 Ohms
Power Output:	200 Watts PEP
Spurious Emissions:	At least 60 dB down
Power Source:	DC 30 V and 13.8 V (supplied by FP-29 Power Supply of MARK-V)
Dimensions:	9.6" x 5.4" x 13" WHD (243.5 x 136.5 x 331 mm)

200 W 50 MHz Transverter
FTV-1000

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HEARD IT. WORKED IT. LOGGED IT.

The IC-756PRO. The world's top DX'ers choose ICOM.

Just listen to the guys who actually used them - they know better than anyone what the power of 32 bit IF-DSP technology can do for ham radio. In fact several members were so impressed that they bought '756PROs for their own ham shacks. "It just doesn't get any better than this" - says Glenn Johnson, WØGJ. Is it any wonder - the world's top DX'ers choose ICOM.

IC-756PRO. Push digital to new levels.

HF/6M • 100W • All Mode • Triple Conversion Rx • Dual Watch • 32 Bit IF-DSP • Front Panel Adjustable Noise Reduction • Audio Peak Filter • Auto & Manual Notch Filter • Twin Passband Tuning • 5" TFT Color Display Shows Operating Conditions and Spectrum Scope • CW Memory Keyer • VOX • Auto Antenna Tuner • PC Controllable with Optional ICOM Software

"I was particularly impressed with the '756PRO's front end resistance to overloading. I never heard intermod noises or de-sensing even with the huge pileups we generated. Several times I listened carefully for such problems but they simply weren't there. On CW, once I had picked out a station, I could run the selectivity down to 50Hz and hear ONLY the station I wanted. I have worked pileups from several DX'peditions and have never encountered a radio that held up so well." - FOØAAA member Mike Goode, N9NS.

"All seven of the '756PROs worked flawlessly. We ran RTTY perhaps more than 50% duty cycle, and the radios never even got warm at maximum output. The digital filter controls were so easy to adjust and switch...a contester's dream! We had seven radios, most of the time with three modes at once on any given band. There was NO interstation interference. All of our antennas (except for the 160M & 80M verticals) were within a 75 meter circle."
- A52A member Glenn Johnson, WØGJ

"Just back from K5K, Kingman Reef. The IC-756PROs again performed flawlessly and were a factor in our breaking 80,000 QSOs. I was a participant in FOØAAA, A52A and now K5K, all in 2000, and your radios made a combined 237,000 QSOs. You must be very proud to have your wonderful radios used by these DX'peditions that are now ranked as 3 of the top 6 Dx'peditions in terms of QSOs in the history of our hobby." - K5K member, Bob Allphin, K4UEE*

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See dealer for details.

Where to next?

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